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Popular Health Lectures.

ADDRESS BY H E THE GOVERNOR OF MADRAS

I AM sure you will agree with me that we have had a most interesting lecture by Major Elwes. I should like to say how much I welcome this good attendance, which has heard the lecture, and I am sure Major Ross will feel, though he regrets his not being able to be present—a regret which we all deeply share—that justice has been done and more than done to the subject on which he was to speak. In this connection I should like to say how much the lecture was helped by the admirable working of the magic lantern. I should like also to thank Major Elwes for all the trouble and pains he has taken in working with the Committee organised for the purpose. All those who on behalf of science are interested in such enterprises know how much depends on the Secretary. We all know that Major Elwes is one who will not spare himself in such enterprises, and I can say personally what great pains he has been at to see that every detail is right and that nothing shall interfere with the full enjoyment of these lectures by the audience who come to attend them. I should like to emphasise what Major Elwes has said about this being a matter for public agency. There is much effort going on through the agency of medical men and the hospitals and dispensaries throughout district and municipal authorities, and with the help of our engineers a great deal of effort is now directed to the protection of public health. None of these, as Major

Elwes has so emphatically pointed out, can have then full effect without the co-operation of the community, and the purpose of these lectures is not to supersede but to strengthen these efforts, by implanting in the mind of everybody the conviction that he has a duty to perform to himself and to his family and to the community

India's Death Rate.

I look at the waste of life all round us which is due to diseases. In all India the death rate is about 30 per thousand. In England and Wales it is rather over 15. If you could bring the Indian death rate down to the England and Wales death rate, you would save something over 4 millions of lives per annum. In this City during the last 30 years there has been a slow and steady increase in the death rate, there has been indeed an excess of the death rate over the birth rate. The mean death rate for 1901-10 was 43.6 per mille. Consider the loss of economic strength and working power revealed by these figures—which fall far short of a full statement of that loss, for there is an almost immeasurable additional loss in illness and physical weakness and inefficiency.

Take again “Infantile mortality,”—death of infants under 1 year for every 1,000 births —

In Madras Presidency	188
In Madras City	300
In London	91

Take next cholera. In the Presidency during the last nineteen years nearly 1½ million people have died of cholera, or an average of 64,222 per annum. For all India, from 1900 to 1913, the annual average death rate from cholera is 404,047.

Then plague. While the annual average of deaths from plague in this Presidency since 1899 is 6,453 or much less relatively than some other parts of India, India as a whole has lost from plague, from 1893 to 1913, about 8½ million lives (8,451,981) or an annual average of over 450,000.

Conditions in Europe

Now glance for a moment at the history of Europe in regard to these and similar diseases. For many centuries civilised mankind seems to have forgotten that the mass of disease is preventable. The ancient Greeks cultivated physical strength and beauty. The Romans have left to us aqueducts and baths, both private and public, but neither among the Greeks nor the Romans does there seem to have been any general effort to combat disease. In the Middle Ages, Europe was repeatedly ravaged by plague and epidemics. The records of the twelfth century chronicle 15 epidemics and as many famines, the thirteenth century 20 plagues and 19 famines, the fourteenth century 8 epidemics and a succession of famines, and it is estimated that in the Black Death, which attacked Europe from the East, reaching England in the year 1348, no less than 25 millions of people died. Towards the end of the next century, in 1485, England was attacked by the Sweating Sickness, another form of plague, apparently due to filthy and dirty surroundings. After a succession of reappearances it passed away about the middle of the sixteenth century (1551), and the last of that series of appearances of plague in England was in 1665, when it was followed in the subsequent year by the great fire of London.

The Jews

While, however, this was the lamentable condition of Europe, there was one ancient people, very far back in the history of mankind, in whom we see clearly the presence of the idea, the governing idea, that disease can be prevented by attention to the laws and conditions of healthy living. The desire of the Jew was that his days might be long in the land and that his race should grow strong and multiply, and it is familiar to you no doubt that the hygienic code of the Jew was remarkably complete. More than 3,000 years ago then laws dealt with food and with feeding, with the isolation of the sick, infection, leprosy, plague, open spaces, the covering and removal of refuse, the cleansing and the annual repair of wells

and sewers, sanitary inspection of meat and household utensils, notification of disease and disinfection. The Mosaic system of sanitary law regarded every man as his brother's keeper. Bodily disease was regarded as a type of sin, and the connection between moral and physical evil was plainly accepted. The care of personal health was enforced by religious sanction and authority, and these influences were powerful in elevating into a free and civilised people a race only recently emancipated from slavery, and they have left their mark upon the Jews to this day. Modern Jews have profited by the scrupulous observance of sanitation by their forefathers, not only in their greater relative longevity as compared with other civilised peoples, but in their freedom from, and power of resistance to, scourges and plagues, which have decimated other nations among whom they lived.

Improving Public Health

Similarly with plague which, as I have described, killed its millions in Europe in the Middle Ages and was rife even in the sixteenth and seventeenth centuries plague has been exterminated in the greater part of Europe. Here we have not succeeded in stamping it out, though that is perfectly possible and will, I trust, come in time. In the same way, more recently, for something like 70 or 80 years, indeed since the recovery of Europe from the great Napoleonic wars, the Governments of nearly all civilised countries have been working to improve public health. India has been doing the same. Cholera had its original home probably in India. It has gone westward and spread over the world four times during the nineteenth century. (In 1817—1823, 1826—1838, 1846—1848, 1863—1865, 1873). It is still familiar to us here, it was responsible for 68,449 deaths in this Presidency during 1914. There has been no serious outbreak of cholera in England for over twenty years or more.

Plague

The re-appearance of plague in India seems to date from August, 1896, when it began in Bombay. Since then more

than eight millions of people have died of it in this country in this Presidency alone 456,443 And we have not yet succeeded in doing what is perfectly possible, namely, stamping it out I say perfectly possible, for I have seen it myself stamped out, no doubt under other conditions I remember arriving by train one evening in the year 1899 at the Central Station in Glasgow I proposed to sleep at the Central Station Hotel, adjoining the station, an enormous building containing some hundreds of bedrooms To my surprise I found the whole place bare, empty, uninhabited A few cases, some of which had died, had been admitted into the Hospital and diagnosed as bubonic plague The physician who made this diagnosis had never seen plague Upon his opinion depended the closing of the Port of Glasgow, the interruption of shipping the possible loss of hundreds of thousands of pounds, with all the consequent distress and unemployment which would follow the establishment of strict examination at every Continental port, a laborious survey of the infected area of the city, the searching out of contact cases, the cleansing of houses and sewers, the hunting of rats and a thousand other administrative processes, not only in Glasgow but throughout the United Kingdom The diagnosis was made and announced It stood the test, fresh cases confirmed it, and plague appeared again a year or two later, both in rats and in men That is how this great hotel was closed, as I have described Plague is a terror in Europe, but it is a terror under control In this instance, in Scotland, it was kept within narrow limits and by the determined and widespread application of precautions it was stamped out

Tuberculosis, etc.

I have not got the figures for an accurate comparison, but in England and Wales there has been a steady decrease for the last fifty years, and recently at slightly higher rate There are some diseases which, it must be admitted, are not yet under such control measles for instance does not abate, cancer seems to be so far incurable but any day the

investigations going on at this moment may throw light upon these problems and what has been done in the way of stamping out other diseases give us strong hope for the future

Let me give you one or two remarkable instances of this in diseases which are or used to be well-known in Europe

I take the figures for Scotland, as I happen to have them, for typhus fever and small-pox. In 1866, just about 50 years ago, typhus killed 3,272 people, that is 108 for every 100,000 people. Mark now the change. In 1880, 14 years later, it killed only 5, instead of 180 per 100,000, and in 1908, the last year for which I have figures, it killed—per 100,000 instead of 5, something less than one quarter of 1 person. That is to say, a disease, which alone accounted for tens of thousands of sick, and thousands of deaths, has been practically banished in 50 years. Moreover, the germ which causes the disease is, I believe, still undiscovered, though the disease itself is well understood. How has this success been attained? By the common effort of the community, co-operating with medical advice and direction, by isolation, by preventing overcrowding, by drainage, by the systematic removal of waste and refuse. Surely an example worth consideration. The death rate from small-pox in Scotland is the same, only a little less striking. The death rate from small-pox was 35 per 100,000. In the same interval of time, 50 years, it has been reduced from 35 to 1. Scarlet fever, again, has decreased from 98 to 19.

The British death rate

Summing up these and similar results—and here I am obliged to quote the figures not for Scotland, but for England and Wales, where the results have been much the same—the annual death-rate now is about 14 per thousand living, 50 years ago, *ie*, from 1861-65, it was equal to 21.4 per thousand living. It has fallen steadily throughout this period, and the difference means that for every 1,000 living people, only some 14 died in each year, as compared with 21 who

died 50 years ago. There is thus a saving of 7 lives for every thousand of the population, and as the population of England and Wales may be taken as 35 millions, the numbers saved when added up become enormous. In 50 years at least 245,000 lives have been saved. Applied to the population of India, this rate of saving would have meant the preservation of nearly $2\frac{1}{2}$ millions of lives.

Work in India

It must not be forgotten that a great deal has been done here in India, in the same direction, of reducing disease, which is most encouraging. Among European troops in India, the present average death rate, 17.5 per thousand, is about one quarter of what it was 70 years ago. Among Indian troops in India at that time the death rate was probably 22 per thousand, it has now been reduced to 11.7, or by about one half. In jails, too, the death rate shows progress. Under normal conditions the annual death rate of the free population between the ages of 20 and 64 is now about 29 per thousand. For all India, in jails, it is 21.4. The only figures I can give you of general importance in India are those of small-pox. In the decade 1871-1880, the deaths from small-pox in British India numbered 168,964, 20 years later this number stood at less than half, or 81,233.

Not many years ago, I remember a book was published entitled, "Some Emotions and a Moral." I suggest as a description of these lectures the title "Some Illustrations and a Moral." The moral of all these illustrations and of this lecture upon malaria and of the whole course of these lectures is that the great mass of disease is preventable, and preventable only by the common effort of the community under skilled and enlightened guidance. Now we have the skilled and enlightened guidance and the purpose of these lectures is to educate and urge all sections of the community to take a share in this effort. This is a campaign to save life, not to destroy it. I appeal confidently to you all to consider its purpose seriously and to give it all the help which it deserves.

An Appeal

You are aware of the health conditions of this town and of this Presidency. They have a claim upon your help, and they call loudly for common, united, continuous effort. Without physical health no individuals and no people can attain the full measures of their powers and faculties. No doubt, conditions here are different from those in Europe. Remedies and methods may have accordingly to be different. Time and work and experience will help us and will indicate the true lines of advance here as elsewhere. The essential requisite for success, the condition without which success is unobtainable, is personal, individual, effort. Without this, public administration and public expenditure upon sanitation must be weak and ineffectual. It requires for its full efficacy the co-operation of every householder and every individual, without which it will not and cannot be completely successful. There is every motive to stir us to action in this matter and to take a personal part in the never-ending campaign to save life. In the first place there is the self-interest of the individuals, for while it is true that as the community is simply the aggregate of the individuals who compose it and that accordingly there can be no public health without the personal health of individuals, it is equally true that only under conditions of general public health can the individual attain his full personal efficiency. Epidemics are no respecters of persons and the brightest and best, strongest and most promising among us are only too often struck down by them. In this respect, we are each one of us our brother's keeper and slums and filthy conditions of life or labour are a danger not only to the slum dwellers, but to the places which adjoin them. There is waste and shortening of lives by constitutional weakness, by infection and by illness, and there is destruction of life by disease. Such loss of life is an absolute reduction of the working power and strength and wealth of the community. Lastly, the obligation is laid upon all by our common humanity to relieve pain and suffering by every means in our power.

The Lectures

To aid in this campaign is the purpose of this course of lectures. It is intended, as has already been announced, that they should be delivered not only here, but, if they are acceptable, elsewhere, and arrangements will be made if there is a sufficient demand, for their translation into the chief vernaculars of the Presidency. Both lectures and slides will be made available for this purpose. As you are aware, this course of lectures is being held under the auspices of the St. John Ambulance Association, which is in other respects doing excellent work among us and throughout the Presidency, which has among its purposes the promotion of health and hygiene. There is, however, as I have already said, a very large field in many directions for united effort of this kind, and, provided that public support, Indian and European, is assured, steps will be taken later on to propose the formation of a Madras Presidency Health Association, having its headquarters here and branches in the mofussil, wherever voluntary workers will come forward. This Madras Presidency Health Association should be a comprehensive, voluntary, popular organisation for the promotion of healthy conditions of life throughout the Presidency, in which all individuals could co-operate and to which all kindred organisations might be affiliated, and which might serve as a centre to which all those interested might look for information and encouragement in everything which concerns the preservation and improvement of the health and strength of the people of the Madras Presidency. To reduce pain and suffering, to lengthen life and to add to the prosperity and wealth of India, are objects worthy of our utmost endeavours.



The Drainage of Cities.*

[BY J W MADELEY, M A , M INST CE , M AM SOC CE
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1 *The congregation of human beings into large communities leads to unhealthy conditions*
 Necessity for drain- Eventually existence in crowded cities,
 age comes within the law that the lives of all
 organisms come to an end when the products of their life
 processes are not removed with sufficient rapidity and thoroughness

This law has already come into operation in many Indian Cities, with the result that we find the inhabitants suffering from numerous preventable diseases which are causing high, and in some cases, increasing death rates. In Madras City at the present time, the death rate actually exceeds the birth rate.

Seeing that for every death there are many cases of illness, a high death rate means a great loss in the efficiency of the community. This is sufficiently notable to cause Europeans newly arrived in this country to remark how often members of their staffs are absent on account of sickness.

It must be remembered that for every death there are some 14 cases of illness lasting 5 days on the average. In Madras City if death rate were reduced from 42 to 20, which ought to be possible, 11,000 lives would be saved yearly. There would be 154,000 fewer cases of sickness yearly. In other words, 7,70,000 days of sickness, or a man's work for 200 years would be saved to the community every year.

It is the business of Sanitarians to cure this state of things. The Sanitary Engineer does his share in designing and

* Being a lecture delivered at Palamcottah by invitation of the District Board of Tinnevely and the Municipalities of Tinnevely, Palamcottah and Tuticorin. Revised by author.

constructing works for the supply of pure water, and for the rapid collection, removal and destruction of waste products—garbage, excreta, fouled water, and fouled air. Of these none is more important than drainage. For instance, the Madras City Health Officer considers that the health of that city cannot be improved materially, until a complete and efficient system of underground drains has been installed.

2. There is a tendency at times to treat drainage work as an inferior type of engineering. This is probably because most of the work is hidden underground, and because drains are constructed to deal with foul liquids. I do not want any of my hearers to form such an erroneous opinion.

Let us rather remember that drainage works are wealth to the community in the truest sense of the word, that in making for health, they add to well-being and happiness.

This is recognised by the Government of India who have stated in a recent resolution — “Drainage Schemes, on modern lines, are the basis of all sanitary improvement in urban areas” (G. O. No 1364 L, dated 31st August, 1914).

Here it may be stated that drainage works should be constructed concurrently with pipe water works. The great boon of a piped water supply is universally admitted, but it is liable to be a curse if there is no drainage system to carry off the fouled surplus. On the other hand, a water supply is required to flush the drains and keep them clean. Therefore water supply and drainage are dependent on each other and one should not be provided without the other.

As the result of considerable experience, I venture to say that there are few more difficult engineering works than the construction of deep sewers, screening chambers and silt pits, and pumping station foundations in bad ground below water level.

In this connection, I will quote from Walter Savage Landor who, in his "Imaginary Conversations," makes one of his characters say —

"He who devises the plan of a great city, of its streets, its palaces, its temples, must exercise much reflection, and many kinds of knowledge yet those which strike most the vulgar, most even the scientific, require less care, less knowledge, less beneficence than what are called the viler parts, and are the most obscure and unobserved—the construction of the sewers"

It may be explained that a *drain* is merely a channel along which a liquid will flow by gravity. It may be open or it may be closed. It may be above the ground or it may be buried under the ground. It may carry clean water or it may carry foul water. In the latter case, it is usually called a sewage drain, and if closed, a *sewer*.

3 Sewage drains in India are of
Types of sewage systems three types —

- (1) Open Drains,
- (2) Closed Drains—usually underground,
- (3) Combined Drains, in which open drains collect the sewage and discharge it at intervals into closed drains

In Europe, the closed system of drains is universal in large towns, but in India open drains are, at present, far more used than closed drains, though there is a strong tendency, in the case of the larger and more wealthy communities, to abandon open drains and to adopt closed underground drains. Lucknow may be cited as a city where an excellent system of open drains, only recently completed, is being replaced by underground drains. Madras, and Georgetown (Madras) are other examples.

The view now generally accepted on this subject is well expressed in a resolution of the Government of India, dated 23rd May, 1914, in which it is stated that "*when drainage schemes on modern lines were first started in this country there*

seems to have been a bias against the use of sewers and whenever possible, open drains were adopted. Experience has shown that the preference for the open drain, and the fears that sewers would give excessive trouble, were not well founded. On the contrary, much of the advantage of a drainage system is lost if only open drains are used, as the old system of hand carriage latrines has to be continued. Moreover, economy in establishments is possible only in the case of a sewerage system."

4 Where the open drainage system is adopted, it is usual to construct a masonry open drain along each of the two sides of the street. These drains take the form of channels built of stone, brick, concrete, or a combination of these materials. It is preferable to have the invert of glazed stone-ware half pipes, so as to ensure a smooth surface which is easily cleaned. If the drains are constructed of concrete or brickwork, they are usually coated with $\frac{1}{2}$ -in. to $\frac{3}{4}$ -in. of Portland cement plaster consisting of 1 part cement to 3 parts sand by volume, and finished off with a skin of neat cement. These open drains are laid at gradients so that the liquid flows by gravity to some outfall where it can be dealt with. They are only intended to convey fouled water, and not solid excreta, which should be rigidly excluded.

5 I am myself convinced that for large flat thickly populated towns, as are most large Indian towns, underground drains, combined with water carriage removal of excreta, are much to be preferred to open drains. I will now mention some of the disadvantages of open drains.

6 A grave fault resulting from open drains is the necessity for hand removal of excreta, which is very expensive, and is also a filthy and degrading occupation employing a large amount of child and woman labour. Compared

with the cleanly flush-out latrine and the water-closet, it is indeed a barbarism

Experience is proving that as the populace becomes more enlightened, it becomes more and more difficult to obtain persons who will do the work of scavengers. In Madras City it is already a serious problem. It is impossible to get sufficient labour for the efficient public and private conservancy of the city, although scavengers are able to earn the high wages of Rs 25 per month.

7 Every time it rains, large quantities of sand and road metal get washed into the side drains, which are also used as receptacles for much garbage and rubbish that should go direct to incinerators, or other place of rubbish disposal. Silt, etc, carried into open drains. It is almost impossible to avoid frequent blockage of side drains, for such blockage may take place within a few minutes of cleaning, and in consequence, a side drain, as a rule, contains long pools of more or less stagnant sewage.

8 Another disadvantage of open drains is the amount of cleaning they require. It is found necessary to clean open drains twice every day. Difficulty of cleaning open drains. In Madras this is done by scraping out silt, leaves, etc, and placing them on the roadside when they are removed by conservancy carts.

In the interval between deposit and removal, the silt remains by the roadside. It may dry and be blown on to food, or into the eyes, mouth and nostrils of passers-by, or, if it remains wet, some of it will be carried away on the feet of pedestrians, to be redeposited inside dwelling houses. In either case it becomes a menace to health.

In the United Provinces (Lucknow, Benares, etc), the *small laterals* are cleaned by a *bhisti* in conjunction with a sweeper. This combination is said to be able to deal with

3,000 feet of open drain both morning and evening, but in these towns, the gradients are good. The United Provinces Engineers have informed me that it is only the blasti and sweeper working together on low wages, that make open drains possible in those provinces. They are convinced that when the inevitable rise in wages of these men takes place, the cleaning of open drains will become an exceedingly costly business.

9 House flies may be observed any day in Madras to settle on the wetted sides of open drains, and to fly directly thence and alight on passers-by, on children's eyes, and on the food exposed for sale on the stalls of the bazars. There may be washings, urine, and even faecal matter in that sewage, from a person suffering from enteric, tuberculosis, or cholera—all diseases that may be conveyed by flies. Nearly all exposed sullage in Madras may be seen to be the feeding, or breeding place of countless mosquito-like flies, and for this reason alone side drains should be abolished.

To show how very serious this is, I will again quote from G. O. No. 1364 L, dated 3-8-14, referring to cholera, it says —

"It has also been shown that the germs of the disease can be recovered from a patient's dejecta kept under natural conditions for a variable but frequently considerable period, and that flies may play an important part in the dissemination of infection. These observations, while in no way opposed to previous knowledge that cholera is a water-borne disease, accentuate the importance of careful and thorough conservancy."

"Apart from the discomfort which they cause, flies are known to be the disseminators of many diseases, including cholera, enteric fever, tuberculosis, dysentery, and diarrhoea and are largely responsible for the heavy mortality amongst infants."

10 In Georgetown, Madras, a carefully thought out system of masonry side drains, delivering their sewage into underground sewers, has been installed. Here we see side drains laid as well as is possible in a flat city like Madras, but even here great faults are apparent. For many hours of the day, the side drains contain long lengths of semi-stagnant gas-generating sewage and the most familiar smell in the denser parts of this city is that of fetid gas rising from putrifying sewage. I also noticed its presence this morning in Tinnevely. This gas has not itself been found normally to contain disease germs in greater numbers than does ordinary air in many dwellings, but it acts poisonously and insidiously. It lowers vitality, and renders those who breathe it unhealthy and unable to resist disease.

A correctly designed and properly constructed underground drainage system is free from these faults. The solid excreta are removed almost immediately after deposition, and are carried by means of water to the sewers in a cleanly and inoffensive manner. Silt is excluded, by the construction of properly designed inlets. Cleaning is only required to a small extent for a properly designed system the flow of water carries along all the solid matters that obtain access to the sewers. House flies cannot obtain access to the sewers as every inlet is protected by a "trap."

The foul gas generated by the decomposition of sewage which is such a serious fault in the case of open drains, is with the underground system, liberated at selected points by means of ventilating shafts, carried up well above buildings, so that there is no chance of it being inhaled by human beings. To prevent the gas escaping into houses, at the roadside, or anywhere else, except at pre-determined points, every connection to a drain is protected by means of what is called a trap which is really in effect a bend in a pipe in which water lodges and has to be forced back under a pressure of 2 or 3 inches of water before the gas can get past it. Hence

underground sewers are free from the objections of open drains—objections which, in thickly populated towns, become a serious menace to health

11 There are five general methods of arranging sewers, one or more of which may be adopted according to the configuration of the ground. What may be the most suitable system in any particular case can be most readily decided by a careful examination of an accurately contoured map of the area, which should always be prepared as the first step towards drawing up a drainage scheme

Systems of arranging
sewers

The five types of drainage systems are —

(1) **THE PERPENDICULAR SYSTEM** —In the perpendicular system, *the main sewer runs down a minor drainage depression* to the principal drainage line. In a drainage area of considerable extent, there would probably be a number of minor drainage depressions and consequently a number of main sewers which would discharge into the stream or river which inevitably runs along the main drainage depression, unless this be the sea. When drainage systems were first started, this was the usual method of draining riverside or sea-side towns. In most cases, it has been found that the discharge of some, or possibly of all the sewers, creates a nuisance, and in such cases, it has been necessary to construct *intercepting sewers** at considerable expense, and thus convert the system into the second type of drainage system.

(2) **THE INTERCEPTING SYSTEM** —This system is adopted when the ground falls in one direction, the branch sewers being laid along the line of steepest slope as in the perpendicular system, and discharging into intercepting sewers running along the lowest ground. This arrangement is very generally adopted in the case of riverside or sea-side towns, and also in dealing with old works where it is required to dispose of

* These are sewers which cut off or 'intercept' the ordinary sewers.

the sewage at a single point. For example, in Benares, the sewage was originally laid out on the perpendicular system, and discharged into the river at numerous points along the river front of the town. The result was that the river was badly fouled. To remedy this, an intercepting sewer has been laid along the bank of the river. The new sewer cuts off the old sewers and conveys the sewage to a point down-stream of the town well away from any built over area. Many other towns all the world over have systems similar to the original Benares system and have now to face the great cost of constructing intercepting sewers.

(3) **THE RADIAL SYSTEM** —In the Radial System the main lines of the sewers lead away from one centre to points round the circumference of the drainage area. Berlin furnishes a notable example of this method, which was adopted in order to convey sewage to farms situated outside the city.

(4) **THE ZONE SYSTEM** is adopted where part of the town lies at a good elevation, and part of it is so low that pumping is necessary for certain areas. In such cases, it is usual to divide up the area into sections or zones of different levels, so that the higher levels may be drained by gravity, leaving the sewage of the low levels only to be pumped. In some cases, where the sewage is discharged into the sea, it is possible to store the low level sewage during high tides and discharge it on the ebb tides.

The Zone System is frequently adopted in the case of sea-side towns situated partly on rising ground, and partly on flat low-lying ground adjacent to the sea. It may be regarded as a modification of the intercepting system, inasmuch as different zones are dealt with by intercepting sewers at different levels. The zone system is also frequently used when the area is on a hill-side so steep that it would be inconvenient to carry the sewers direct into a single intercepting sewer at the bottom. In this case, intercepting sewers at different levels are connected at some convenient point.

(5) THE SEPARATE DRAINAGE AREA SYSTEM —In some towns of the Indian plains, such as Madras, there are no well-defined topographical features, and no definite drainage lines, and in consequence, none of the above-mentioned systems can be used. In such cases, the drainage area has to be subdivided into minor areas, each draining to a centre, where the sewage is pumped and sent on its way to the disposal works.

If the contoured plan of the town of Madras is examined, it will be found that there is very little natural fall that can be utilized for drainage purposes. There may be however natural features, such as the river Cooum and the Buckingham Canal in Madras, which form obstacles to sewer laying, and form natural boundaries of minor drainage areas. The extent of these minor drainage areas is limited by the depths at which sewers can be laid economically, that is, by the nature of the ground and the quantity of sub-soil water encountered.

The above represent the five types into which drainage systems may conveniently be divided, but in the case of large areas, it is very frequently necessary to adopt more than one system. As a general rule, as much sewage as possible should be carried away by gravitation because the cost of upkeep of gravity sewers is very small compared with that of pumps, and furthermore, they will last for a very long time, whereas pumps will probably have to be renewed every 20 or 30 years.

12 The following are the most important principles governing the design of the drainage system now in course of construction for Madras City. They are given here to indicate the points that have to be settled before a drainage system can be designed.

Principles governing sewer lay out

(1) The closely built-up areas of the city will be drained throughout by *underground sewers*. In those areas where the population is very meagre and scattered, the present method of conservancy will be continued until the population increases to such an extent that drainage becomes necessary. In some

cases local methods of disposal may be adopted, *e g*, application of sewage to land, incineration of nightsoil, and such other methods as the conditions may warrant

(2) In the drainage system, *storm water will be excluded* as rigidly as possible. Overflows will be provided wherever possible and where they will not produce a nuisance. Unfortunately owing to the low level of Madras, they cannot be provided so as to prevent surcharging of the sewers

(3) *Silt will be excluded* from the sewers as far as possible, the special "Madras" apparatus being used where required

(4) *The Built-up portion of the city will be divided into areas*, the drainage of each of which will gravitate to a pumping station, so situated as to deal with the largest possible area

(5) *The Main sewers will be laid at the flattest possible gradients consistent with efficiency* in order to extend the boundaries of the drainage areas as much as possible

Branch sewers are laid at the steepest gradients which the levels of the main sewers permit, provided that a velocity of 6 feet per second is not exceeded and that the expense is not excessive

(6) *The main sewer will be continued until the depth attained makes further laying impracticable* so as to enlarge the drainage areas as much as possible

(7) *Ventilation will be provided by means of shafts and perforated manhole covers*. Where conditions render them necessary, special measures will be taken to secure adequate ventilation. *By omitting the intercepting traps on first-class house drainage connections* great assistance will be secured towards efficient ventilation of the sewers

(8) *Flushing arrangements to insure a large rush of water for a short while will be provided at the heads of all sewers* and at such other points as require flushing. The waste water from street fountains and washing places will

be utilised, as far as possible for flushing both latrines and sewers

(9) *Short pump deliveries and gravitation mains* will be adopted as far as possible in preference to long pumping mains

Rules followed in laying out drainage system

13 The following rules have been followed in laying out the system —

1 The SIZES OF SEWERS in all cases have been fixed so as to be capable of carrying off in six hours half the whole daily quantity of sewage of the anticipated population of 1960 of the areas drained by them, PLUS an allowance for rainfall equal to one-third of the maximum flow. The pipe sewers will be half full and the brick gravitation mains three-quarters full, when carrying this flow

Thus the maximum carrying capacity of the pipe sewers will be at least $5\frac{1}{2}$ the estimated average dry weather flow of 1960, while the brick gravitation mains will carry at least $3\frac{1}{2}$ times the same dry weather flow

In some cases, where the nature of the district renders it desirable, the sizes of the sewers have been made somewhat larger than the above rules would give, so as to make the capacities sufficient for future development

(2) The MEAN DRY WEATHER flow for the sewers is taken as 25 gallons per head per day for the anticipated population of 1960.

(3) The sewers have been laid out at gradients which will give self-cleansing velocities

(4) For reasons of economy BRICK SEWERS will, as far as possible, be used for sewers above 18 inches in diameter. The main brick sewers have been designed of circular section, after carefully balancing the advantages of this section as compared with the oval section

CAST-IRON PIPES will be laid as sewers in deep excavation where especially large volumes of water are encountered

(5) RIDER SEWERS will be employed wherever economy, safety or convenience can be secured by their use. For example, rider sewers, connecting with the main sewer at manholes, can usually be profitably employed where such main sewer is of cast-iron or brickwork in deep excavation.

(6) All MANHOLES will be provided with cast-iron covers. There will never be more than 300 feet between adjacent manholes on pipe sewers, and less than that on the 6-inch pipe sewers.

(7) Special types of flush-out and dry LATRINES have been designed, suitable for use by the different classes of the community. It is intended that these should be installed at convenient points all over the city.

(8) PARACHERRIES will be drained by open drains connected to the sewers through specially designed silt and storm water separators.

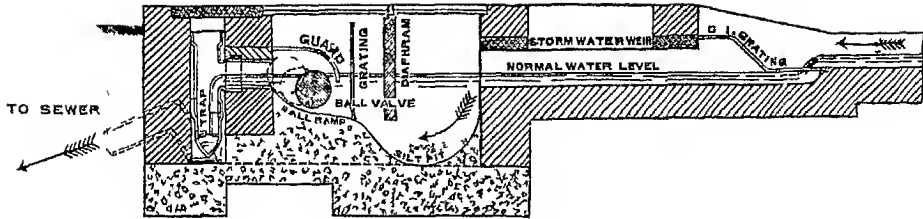
(9) NIGHT-SOIL DEPOTS will be provided for the introduction of night-soil into the sewers at suitable points pending the complete installation of the water carriage system. These will be so arranged as to convey all night-soil rapidly to the sewers.

(10) At the PUMPING STATIONS the plant will be subdivided so as to be capable of dealing economically with the usual variations of flow. Stand-by plant will also be provided. The number of units will depend on the quantity of sewage and the nature of the plant.

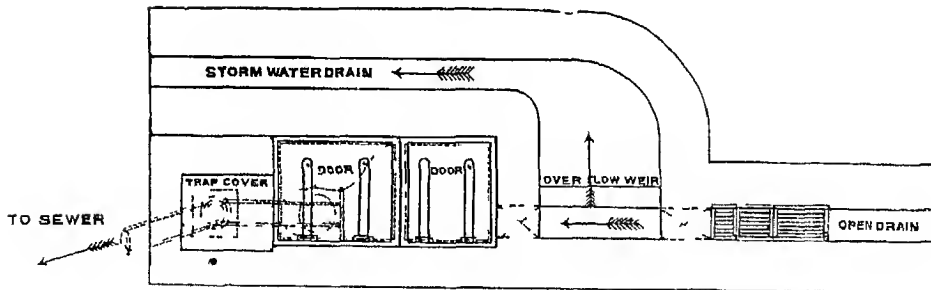
The PUMPING PLANT exclusive of the stand-by will be capable of dealing with 3 times the estimated average dry weather flow of 1936.

(11) Where there is a considerable head or where the head varies greatly, direct-acting Steam Engine Pumps will be employed. Centrifugal Pumps driven by Oil Engines, Suction Gas Engines or Electric Motors, or Pneumatic Ejectors

SECTION



PLAN



THE MADRAS STORM-WATER SEPARATOR

Patented by Mr J W Madeley,
Special Engineer to the Corporation of Madras

toilet or Humphrey Pumps, will be employed where the lift is low and where the head is constant

(12) All sewage arriving at the station will be screened and deprived of silt before it reaches the pumps by special silt pits and screening chambers

(13) House drainage will be so carried out as to prevent the introduction, into the municipal sewers, of silt and storm water

(To be concluded)

Fundamentals of Housing Reform.*

[BY DR. JAMES FORD, HARVARD UNIVERSITY]

A HOUSING problem may be said to exist wherever any portion of a population dwells under conditions dangerous to health, safety, or morality. The problem is present to some degree in every American city. It is usually occasioned primarily by the lack of guidance of urban growth, by poor planning of buildings, faulty construction, and defective sanitation, it is aggravated by the greed of some landlords, the carelessness of some tenants, and ignorance of the laws of hygiene on the part of both. The result of bad housing is ill health, both physical and moral, and thereby industrial inefficiency, unemployment, and a long chain of preventable social maladies, which are very costly to the community, and which place a heavy handicap upon individual and social achievement.

Man's dwelling exerts a marked influence upon his life and character. From one-third to one half of his time—and much more than half of the time of women and children—is spent in the home. Bad housing conditions affect health

* Revised and extended by author from article in "The American City," New York.

insidiously by slowly undermining the vitality and thus rendering the individual susceptible to disease. But bad housing conditions also constitute an environment favorable to the life of the germs of a number of diseases. For example, the bacillus of pulmonary tuberculosis can live for weeks and even months in a dark, damp, ill-ventilated and ill-kept environment—in other words, in basement dwellings, in dark halls and dark chambers. The germ of typhoid fever may not only be conveyed through the water or milk supply of a city, but is stated also to be carried by flies and vermin from the filth in which it was deposited to the food of urban households.

Thus a city with an insanitary water supply, or with manure pits and garbage pails uncovered in which the fly may breed and privies in which the bacillus may be picked up, is an environment favorable to the spread of typhoid fever. The tenement house with its halls, stairs, and water-closets shared by many families becomes a sort of clearing-house of the contagious diseases—scarlet fever, measles, etc. The common water-closet may be the source of spread of venereal disease. The indiscriminate overcrowding of sleeping rooms by both sexes may result in the spread of the same diseases and also in an undermining of the health of adolescents and adults through neurasthenia and other diseases which over-stimulation of sexual instinct and its unsatisfactory fulfillment may occasion.

The safety of an urban population is in many ways affected by housing conditions. The overcrowding of lots with buildings erected of combustible material creates a serious conflagration risk, especially where buildings are of frame exterior or are used both as stores and dwellings, as is common in our large American cities. Fire escapes reduce the danger to tenants from fire, but improperly constructed fire escapes constitute a new risk from accident. The presence of stores, bakeries, and

Housing and Public
Safety

workshops in non-fireproof tenement houses, the storage of combustible materials, such as rags, paints, etc., the encumbrance of fire escapes, the proximity of railroads, and the manufacture of explosives—all affect in varying degree the safety of the tenant

Intimately dependent upon the housing conditions is the morality of the population. The crowding of rooms with three or more members of a family, children of both sexes sleeping together or with parents, and the presence of lodgers within the tenement make impossible the maintenance of high standards of personal decency. Premature knowledge of sex function by the children is the inevitable result of overcrowding, and often morbid stimulation of sex instincts, sex perversion and vice originate in room congestion. Yet indiscriminate crowding of sleeping rooms prevails very widely within the immigrant population groups of our cities. The dark halls and common toilets add to the menace for the growing children of the tenements, and frequently the presence of commercialized vice within residence quarters familiarizes the child with the worst element of our civilization before the child's mind is far enough developed to resist the superficial allurements.

A general reduction of vitality, or disease of any sort acquired through residence under conditions above described, results necessarily in reduction of industrial efficiency. Disease causes absence from work, which means reduced earnings, increased expenses, and perhaps also a long period of unemployment before new work is found. In extreme examples, a state of mind which has been termed 'slum disease' is apparent, in which individuals have become chronically indifferent or careless because they have found themselves unable to cope effectively with an always depressing environment. The serious effect of this attitude of mind upon industrial output is obvious.

It is impossible to create a high civilization in a democracy where a large portion of the population must exert its entire life in struggling against destructive environmental conditions. The body is the tool of both mind and soul. A healthy body is a first requisite of the largest moral life. An individual can contribute little to the promotion of general well-being until rid of the weakness or pain which ill health causes. The essential pre-requisite of efficient democracy is a healthful home life, with elimination of all the destructive elements now present in our slums and with the presence of the constructive elements—sanitation, safety, ventilation, sunlight, space, privacy, and beauty.

Public action, to render the existing slum less dangerous to physical and moral health, begins in 'Health Acts,' the provision of public water supply, public sewage systems, and the regular collection of refuse. Modern Cities or States usually go further and frame health laws, governing the minimum sanitary conditions of existing dwellings. In America the inspection under these laws ordinarily falls as an additional task to existing health or police departments. Building codes, enforced by a local department of buildings, generally set minimum standards for the construction of new buildings. There is a definite modern tendency to fuse requirements covering new and old tenement houses in Tenement House Acts or Housing Acts passed by State legislatures. Such Acts may apply to specified cities, to cities of specified classes, or to an entire State, and may be either compulsory or permissive. The requirements should cover height of new or altered buildings, size of yards, courts, rooms, the lighting of rooms and halls, fireproofing, etc., and should establish standard of sanitation and upkeep, which would make it impossible for any person to build or occupy a tenement which is demonstrably dangerous to health, safety, or morality. Administration under such Acts should be definitely provided for, with ample

penalties and ample funds for continuous and careful inspection, and for all office work involved under the Act. The details of such laws are suggested by the experience of New York City, New Jersey State, Columbus, and by Mr. Lawrence Veiller's recent book, "A Model Housing Law."

The City Plan and the Housing Problem The planning of cities involves the adjustment of the physical resources of the city to meet the needs of its population, present and future. The proper planning of cities may be made to improve housing conditions in a variety of ways. The functions of city planning may be considered conveniently under two captions. First, the remodelling of the old city, and second, the determination of the mode of development of new sections. Of these the first programme is largely remedial in character, while the second is fundamentally preventive.

From the housing point of view the remodelling of portions of the city already built may not have a marked effect upon the dwelling conditions of the population in quarters so treated. In any district in which streets are widened or trees or grass strips are placed, impetus for the remodelling of old buildings is likely to be purely superficial. A new brick face may be placed on an old insanitary building. The dark room may remain. Still under such conditions the occupants profit by an increase of light and air from the widened street, by purification of air where trees are placed and by the increased beauty of their outlook.

The Insanitary Area. City planning within the heart of a built-up city may also involve schemes for dealing in a large way with districts in which the houses are highly insanitary and are beyond repair, positively unsafe, and dangerous to health and morality. There are many ways in which a district of this sort can be treated. First, it may be neglected by health and tenement departments that are overworked and unable to deal with a problem so large

and apparently hopeless. In the second place an attempt might be made to repair the district, either at the cost of the city or by the city at the cost of the owners (the Birmingham method), or the owners might be ordered to make the necessary repairs at their own expense. Special powers would be necessary if improvements on private estates are to be made by the municipality at public expense. The third programme would undoubtedly result in a patchwork reform. No one of these programmes is adequate to deal with such districts, they are merely palliative and might reduce but would not destroy the unhealthfulness of such a district.

Another possibility would be the complete destruction of the entire area by the City. This might be done with the intention of replacing the area with a park—as was done by New York City, for example, in the notorious Mulberry Bend—or the area could be rebuilt by the City with municipal dwellings or other buildings. The cost of the first half of this latter programme renders it undesirable if there is a cheaper alternative which is equally effective. As for the latter, municipal rebuilding of insanitary areas, even in London and Liverpool, where municipal housing is an accepted form of municipal business, has never proved a paying undertaking, chiefly for the following reasons:

1. The original cost of the land and of the destruction of the insanitary houses is either prohibitive or places a too heavy initial charge upon the undertaking.

2. It has been found impossible to build municipal tenements on the same area to house healthfully as many persons as were dishoused by the slum-clearance scheme.

3. The original dishoused population tends to crowd with other families in small tenements while the area is being rebuilt, and does not return to the new buildings when completed, largely because the rents are inevitably higher than they were for the original accommodation.

4 It becomes profitable for a low class of speculators to buy insanitary property and hold it unrepaired in the hope that the Government will purchase it for a slum-clearance scheme of this sort, paying them, as is usually the case, more for the land and buildings than they are really worth

Even if these arguments were not operative in American cities, municipal housing would for the present at least be undesirable, both because it is unnecessary (private capital, properly encouraged, can be relied upon to provide the necessary accommodations) and also because in our American cities we cannot guarantee the continued employment of expert men to operate a municipal housing department. Municipal housing will not pay where long tenure of office cannot be guaranteed to efficient administrators, or where politics and slender appropriations can ruin the work of competent administrators.

Another possible way of dealing with such an area deserves very serious and extensive consideration, and that is the use of a system of heavy taxation of land values or of the unearned increments. As these measures involve many other considerations besides those of housing, these other bearings of the subject should, of course, be studied with utmost care before the adoption of the scheme. As a fiscal measure, however, the taxation of the unearned increment from land values is, without doubt, a peculiarly just form of taxation and is calculated to bring large annual sums into the city treasury. There is no question that the community is chiefly responsible for increases in land values. It is just, therefore, for the community to appropriate such increases in value, especially if it can do so without placing any hardship upon industry. The only serious difficulties arise in determining a practical method of appropriation and assessment. The diverse schemes of New Zealand, Germany, England, and Western Canada should therefore be studied, and the desirability of using one of these methods should be considered.

The application of a heavy tax on land values (Vancouver method) in the district under consideration (a district in which the value of the land far exceeds the value of improvements upon the land) would have a marked effect upon housing conditions, and would be the cheapest way (assuming that a just method of appropriation was found and employed) in which the city could deal with this district. If the tax were taken off the buildings within such a district and the entire tax was levied upon land, the owners of this property would find it unprofitable to hold their land in its present wretched state. If the entire tax of the city were levied upon land values, the owners of all property that is improved would find their taxes reduced, but the holders of vacant land or of land uneconomically developed would find their taxes increased, and would be confronted with the necessity of building or of selling to some individual who would be willing to build.

The housing conditions of a city are affected materially by the street plan. If suburbs are not accessible directly and cheaply from the centres of industry and commerce, population will tend to crowd in tenements near the heart of the city. Suburbs are rendered especially accessible by means of broad, direct, radial streets, suggestively termed the arteries of the city. Many American cities are built upon a gridiron plan of streets, which renders certain suburbs peculiarly remote because accessible only by following two legs of a triangle instead of following directly upon the hypotenuse.

The type of city plan which should be secured for your city must depend upon our answer to the question, What is the most desirable dwelling place, the tenement or the cottage? In the cities of the North-eastern States we have become accustomed to the tenement house and do not ordinarily question its social utility. There is scarcely a city in the country that is attempting in any well-considered way to eliminate the tenement house, yet there can be no question

Importance of Radial Streets

Tenement versus Cottage

but that it is an undesirable place of residence for families with children. Even for the childless family, the most expensive apartment house as well as the cheapest tenement may constitute an undesirable environment, because of the facility with which disease may spread from one apartment to its neighbour through the common hall and through the mediation of vermin which pass easily from one suite to another.

Where people live in apartments there is also concentration of population and hence much traffic in the neighbouring streets, which keeps the air full of dust and noise and thus renders apartment-living undesirable. The sounds from neighbouring apartments frequently make rest and quiet impossible. True privacy and solitude, though very important to the moral growth of the individual, are difficult to obtain.

For the family with children the apartment is still less desirable. It becomes impossible for the mother of a family to choose the associates for her children, to prevent her child from coming in contact with children or adults of unwholesome character who may reside within the same building. The tenement mother cannot supervise the outdoor play of her child. In general the atmosphere of the tenement or apartment house is one destined to create a race of adults that are unhealthful, puny, and socially highly artificialized.

In the cottage, however, it is possible to obtain all necessary privacy for true home life and personal development. The reduced dust of suburban communities and the larger penetration of sunlight make cottage homes healthier living places for infants and growing children. The mother of the family, while at work in her kitchen, can supervise the play and the associates of her child in the garden. The adults of the family, if so inclined, can profit in health at least—and sometimes in economy—by cultivating a garden outside of working hours. The children gain the advantage and education that come from daily contact with the things of nature, especially through the garden. It is probable, therefore, that

at least for families with children, the suburban home is preferable to the tenement

It is, however, impracticable to house the population of large cities in cottage homes unless such homes can be constructed to rent for a price (including both the cost of land and of the daily transit to and from work) no higher than the same family would pay for an equal number of rooms within the city tenement. Furthermore, families working within the city will not live in the suburbs if a too large proportion of their working day is consumed in transit to and from such residence. If any working member of such family is employed for 10 or 12 hours a day in the heart of the city, the residence should not ordinarily be placed more than one-half hour's ride from the place of business. To secure cottage homes, therefore, for the working classes of our cities, it is essential to have rapid and cheap transit, serving satisfactorily all of the possible outlying residential section. It is equally necessary to have an abundance of cheap land and to make possible the cheap construction of cottage homes.

One means of encouraging cottage construction is to discourage tenement building. If, for example, we require tenement houses over four stories high to be constructed fireproof throughout, as do Philadelphia, Pittsburgh, Scranton, St. Paul, and St. Louis—and require the three or four story tenement to have brick exterior, stairs, halls, and fire towers—investors in house property will construct houses less than three stories in height because they will be comparatively cheaper in cost per unit of construction. Massachusetts towns, which have adopted the permissive Tenement-house Act for towns—Belmont, Arlington, Winthrop, etc.—have eliminated the three-story tenement house for the future by requiring that every tenement house three stories in height shall be fireproof throughout. The cities above mentioned are all of them peculiarly free from high tenement houses.

The measures above indicated would tend to eliminate from your city all new construction of high tenement houses except for apartment houses of the well-to-do classes. They would not, however, absolutely prevent any man from constructing such apartment houses on any lot in the city or suburb which he might chance to own. It would still be possible for a man to place a high apartment house in the midst of a block of private residences, shutting out light from his neighbours' homes, marring the beauty of their outlook with the ugly back of his building, and bringing into that street a class of population of different tastes and perhaps of a type from which neighbouring parents would wish to protect their children. The city of Calgary, in Alberta, attempts to meet this difficulty by providing in its local building code that no owner shall build an apartment house within any city block unless two-thirds of the other owners in the block give their assent. This provision is, however, inequitable, in that it does not give all the persons who are interested in the erection of such apartment house an opportunity to vote. The owner of the property across the street would be equally affected by the building of such apartment house, so, also, in less degree, would the passer-by whose outlook may be marred by its erection.

To protect a community from the intrusion of undesirable building types, it might be desirable here, as in German cities, to establish a zone system of building. The essential feature of the zone system is that a city is divided into districts in which building types are permanently fixed. In the heart of the city the highest buildings may be erected (six stories, in the case of Vienna), in the next district, near the centre of the city, buildings may be erected one story less high and perhaps covering a smaller proportion of the lot. In the third district will be found again a reduced height and a reduced percentage of lot area to be covered. In outlying districts, contiguous building, tenement construction, or build-

ing to the lot line is not permitted, and frequently only 40 per cent of a lot may be covered

The constitutionality of the zone system has been tested in Boston, which has two zones, one for building 125 feet high maximum, and the other with a maximum of 80 feet. More elaborate zoning is now in practice in Minneapolis.

A zone system would inevitably involve the districting of factories if the welfare of the community is to be conserved. Where factories and tenements are mingled, the gases may render living conditions unhealthful or unpleasant. German cities very generally restrict their factories to quarters of the city in which available transportation facilities can be rendered of the best, and to quarters from which the prevailing winds will carry the smoke, dust, gases, and noise away from the city.

One other adjustment of the factory and cottage home is ordinarily termed industrial decentralization. In England especially housing reformers have agitated for the removal of factories from cities into the open country where land is cheap and abundant, where transportation facilities can very frequently be rendered of the best, and where each worker can live in a cottage home. Such industrial communities may be established co-operatively, as in the case of the British "Garden City," or may be established by the owners of factories, as is the current American practice, the houses in this case being erected by the manufacturer either to rent or to sell on easy terms to his employees.

Cottage construction for workingmen is impossible at present wage rates unless land can be procured which is both accessible to work and cheap. Much of the suburban land in American cities is being held vacant to-day by speculators in the hope of reaping a large increase in land values. Accessible land is not easy to procure in small

parcels. There are several ways, however, in which it may be rendered more available. German Cities, for example, quite generally buy up their suburbs and then sell the land in small plots under heavy restrictions as to its future use or transfer, or else lease this land to home builders on long-term leases. By this means suburban land prices can be kept low, the City receiving the unearned increment of its land in the form of enjoyment by working people of its proper usage for homes, instead of receiving it in the form of taxes or rents. The City of Ulm, Germany, between the years 1891 and 1909, thus purchased 1,208 acres of land for \$1,390,000, and sold 404 acres under restrictions for \$1,633,000, thus reaping from its transaction 804 acres of land, \$242,000, in money, and the lowest tax rate in Wurttemberg.

Land prices may be similarly restrained in communities can democratically share the advantages accruing from the unearned increment of land by means of co-operative development. The Co-partnership Tenants Societies formed by artisans, mechanics, and clerks in some 20 British cities, have thus bought patches of suburban land, from 10 to 300 acres in size, at reduced cost per unit, have developed such land co-operatively at reduced cost per unit for architect's services, laying of streets, plumbing, sewerage, etc., have built their houses co-operatively, purchasing materials for 50 or more houses at once at considerably reduced costs. Each tenant pays rent for his cottage home to the Co-partnership Tenants Society to which he and his neighbours belong, and receives his profits (aside from 5 per cent interest earned by his share capital) in the form of dividends on rents, paid not in cash but shares of stock in the society. The unearned increment of the land is the common property of the co-operating members and enhances their profits. The Harborne Co-partnership Society in its garden suburb on the outskirts of Birmingham, England, was formed by workmen who to-day pay rents for these cottage homes at rates no higher than they paid previously for insanitary slum tenements.

in the city. Yet this Society is already able to pay 8 per cent dividends on rents in addition to the regular 5 per cent interest on invested capital. The British workingmen have, however, had more experience in co-operative methods than have the American workingmen.

This method of cheapening and facilitating suburban development is not applicable here without an intermediate period of careful study of co-operative methods by the workingmen who plan the association, and preferably should not be tried until they have had some experience in some form of co-operative practice. Garden suburbs of this character in England and in Germany have been facilitated by cheap loans of capital from philanthropists and from the Governments of these countries. If capital might be obtained from some source at 4 per cent interest for building loans, and if the experiment had the backing of influential citizens, it would be much easier to make it a success.

A third means of reducing the cost of land per cottage would be by use of the land tax already described. If the tax were taken off improvements and placed exclusively upon the land, the vacant land now held in the suburbs by speculators would be placed upon the market or built upon. It is probable that land under such conditions would be more readily available to modest purchasers in the suburbs, and in so far would make suburban housing possible.

Residential streets are often rendered costly through unnecessary width and through the expensive provision of curbs and sidewalks. Some residence streets must be used for a fairly large local traffic. Others are by their very nature and direction precluded from such use. A careful study of this problem will indicate that in certain suburban residential quarters the width of streets might easily be reduced to the provision of a 16 to 22 foot roadway flanked by grass strips. By establishing a building line on each side of such roadway

at some distance from the street, it would be possible for the city to widen its streets without serious expense if that should ever prove necessary. The provision of sidewalks on both sides of the street is purely local. If the street is developed only to such degree as to render it adequate for its local service, the cost of street construction will constitute a much less burden upon home owners.

There are several serious disadvantages in having lots of uniform shape. In the first place a popular prejudice is created for the prevailing deep and narrow lot which is not easily dislodged, and the poor man who wishes to build a cottage home is socially constrained to purchase a lot 100 feet deep whether he needs so much land or not. It is, perhaps, the safest thing for a City, to have standard lots, at least in the heart of the city, until the science of lot distribution and usage is developed. It is not easy to make a definitive prescription for the employment of lots of any other specific size which would be more satisfactory for all purposes. But the lack of elasticity in present lot shapes and sizes is fraught with serious consequences. The 25 by 100 foot lot can not be used economically for workingmen's cottages. It is wasteful of land at the least, for the American workingman will not ordinarily start a garden as will the English or Italian. It is parsimonious of land at the sides of houses, especially if built in the two-flat style. It becomes impossible to construct two-flat houses on lots of this shape which will not be too near to the lot line and thus to neighbouring houses.

If the arterial streets of a city are broad and sufficiently straight, and there are occasional broad cross streets within the residential zones, it should be possible to plan much of the remaining residential land with narrow dirt streets for local service purely, often, perhaps, with one sidewalk or none, grass strips and trees at the sides, and a building line for houses on abutting lots. These streets might wind, which

would enhance their beauty, and if on a hillside, ought to wind in some accordance with the contour lines of the hill. In such quarters, lots of varying shapes and sizes would be possible

Near factory quarters, where land values are not yet prohibitive, the Philadelphia type of housing might be promoted by the establishment of lots of 14 or 15 feet in width and perhaps 40 feet deep, to be built up with 4-room or 6-room cottages, two stories in height, with brick dividing walls on the lot line. Houses of this type could be constructed so as to be available even for the families of day laborers, as the experience of Philadelphia has proved. Preferably if this type of house is to be used, builders should be provided by some competent authority with standard plans showing types of construction that are cheapest in design and at the same time healthful and varied in exterior. Multiple cottages of this type can be constructed to rent or to sell. Streets may be narrow without darkening rooms, but provision should be made for grass strips and trees on all streets of this character, relieving their monotony of type and improving the air for the semi-crowded occupants.

In the outlying portions of the city's contiguous suburbs, both straight and winding streets may be provided, and in specific quarters, lots narrow or wide, shallow or deep, may be accepted according to the prospective use of the quarter. In general, however, the narrow lot should be avoided in such suburbs, and the permission to plat deep lots might be granted, or parks or allotment gardens planned in the centre of certain blocks if the city guarded the right to push a minor street through the middle of the block in the future. Both one and two family houses could be constructed more economically and to greater social advantage on lots from 30 to 35 feet in width and 60 to 70 feet in depth than they can now on the 25 by 100 feet lot. On the wider lot, as specified, houses can be constructed with square-floor plan, two rooms abreast and two or three rooms deep, reducing somewhat the cost of construction, the

cost of heating, and the cost of furnishing such homes. Furthermore, the lot 35 by 60 feet in dimensions uses 400 square feet less of land than the lot of 25 by 100 feet. On it a house may be built with two rooms of ordinary size abreast and may yet leave 5 feet on the side to each lot line. The house may be built two rooms deep and leave a 10-foot lawn in front (insured by municipal provision for a building line) and a 25-foot yard in the rear, which may be encroached upon by a third room in the depth of the house or by a piazza, or may be used as a garden. The only serious disadvantage of this lot plan lies in that it provides for an increased street frontage, and thereby a larger cost to the owner for road construction, etc. But if street costs in residence section are reduced by the means above specified, there will unquestionably be a net gain to society from the use of this method of platting.

Irregular lots on winding streets can be rendered economical and exceedingly beautiful if developed co-operatively in the manner already described. The British copartnership garden suburbs are so planned and yet are able to house workmen at current rates.

If your City is to determine its housing development, it is essential that there be a municipal commission empowered to establish (subject to district referendum) the building zones of the city, to pass upon, and, if necessary, reject plans of land companies for estate development, to determine also the direction, width, paving, and planting of new streets, with power to inaugurate schemes and enforce its decisions in so far as they affect vitally the welfare of the community. There should be a permanent city plan commission for the metropolitan district, even if the suburbs of the city are not all (as they should be) incorporated within the political city. There is much European precedent for the establishment of such commissions with power. German cities are so provided. English Cities, under the Town-planning Act of 1909, may

Public supervision of
suburban development

secure power to regulate the methods and extent of development of land likely to be used for building purposes within, or in the neighbourhood of, their area. They also have power to limit the number of buildings which may be erected per acre and the height and character of those buildings.

In America, city-planning powers of this type are already being given by provincial governments of the cities of Canada. In Ontario, for example, local Town-planning Commissions have power to pass on all lot distribution of towns of 50,000 inhabitants or more, and Cities may plan for the area within 5 miles of their limits. No lots may be sold until such plans are approved. The value of this power is reduced in so far as the promotion of workingmen's suburban homes is concerned by the requirement that all streets shall be at least 60 feet wide. The Provinces of Western Canada have given quite similar power to their Cities. In the States, somewhat similar powers have already been granted to Cities in Pennsylvania and Wisconsin. And that power under the Wisconsin law regarding the platting of land near cities, adopted in 1909, extends to all land within $1\frac{1}{2}$ miles of the limits of such cities.

Suburban development will be encouraged not only by keeping low the price of land and restricting its use but also by any reduction that can be made in the cost of constructing cottage homes for workingmen. In general it is possible to construct tenement houses which shall be cheaper per unit of accommodation than cottage homes. This will probably not be true where tenement houses are required to be fireproof. It is, however, advisable for citizens who are aware of the urgency of their local housing problems to experiment in the construction of detached and multiple cottages. The best ability of architects in America has been turned to monumental work, but the important social problem of designing cheap cottages has been almost overlooked by them. In England the attention of the best architects has been turned to this problem.

The cost of cottage
construction

by the holding of competitions with prizes for the best cottage constructed for a specified sum (£175 in the case of the first Cheap Cottages Exhibition, Garden City, 1905). The purchase of the houses constructed may be guaranteed by the promoting body.

It would be desirable to interest the best-trained architects of America in this problem, for by competition among them new arrangements of houses and new materials for construction will be brought to public attention. Such a competition might be held by a municipality (as, for example, one was held at Sheffield, England, in 1907), but such competition could be held with equal satisfaction by some private organization. The cost of cottage construction may be reduced also by large-scale building, buying and developing several acres of land at a time. This may be done by philanthropic associations, by employers of labor, by commercial building companies, or by co-operative associations of tenants. It is in experiments of the type above indicated that private organizations can do their best work in meeting the problem of promoting suburban housing.

Water Supply to Adoni Town.

[BY C. K. RAMACHANDRA AIYER, ENGINEER
TOWN REMODELLING WORKS, ADONI.]

THE Town had no protected water supply till 1895. Between the years, 1890 to 1893, discussions and investigations about the different schemes went on and in the latter year, Government sanctioned the plans and estimates prepared by the Sanitary Engineer to improve the Nalla Tank by forming it into a reservoir of larger capacity with necessary distribution arrangements.

2. The Nalla Tank is situated about $1\frac{1}{2}$ miles to the north-east of Adoni Town. The reservoir as originally constructed consisted of an earthen bund about 2,000 feet in length connecting the two ranges of hillocks called the

Jogegunda Gutt on the east and Kuianumula Konda on the west. There was an irrigation sluice for the supply of water to the small ayacut below. The catchment basin area of this tank is 3.25 square miles. This area is almost barren except for the sparse growth of scrub jungle in isolated patches which are being conserved as Forest reserved by Government. This tank was then considered to be the best for storage purposes and taken up for detailed investigation in 1893.

3 Generally, the ceded districts are so situated that a copious supply of water during the south-west monsoon could not always be depended upon. The catchment area of this tank is mainly to the north-east of the high hills and catches very little of the south-west monsoon, and in fact the rainfall register shows, that when there has been a good shower in the town, there has been only a light shower on the tank area. The north-east monsoon has to be depended upon for the greater volume of supply, and this monsoon is very precarious and is frequently a complete failure. So, it is only during periods when there is an eccentric precipitate of such monsoon that such large storage works fill in. But this happens only occasionally. The annual average rainfall especially near the Nalla Tank catchment including even such eccentric precipitates is only 25 inches, the minimum in several years having gone so low as 14 inches. It is therefore no wonder that the supply to the tank completely failed in 4 years out of every 9 years—not to mention of partial failures.

4 The storage capacity of the tank as originally designed and carried out is to provide for a 2 years' supply to a 30,000 of population at 10 gallons per head per diem at one filling of the tank. But owing to frequent failures of the monsoons, the supply often failed entirely and the tank became empty on such occasions. During such periods of draught, wells were sunk in the bed about seven in number and water was pumped out to flow into the filter bed. There is yet another small supplementary source. There exists a

hill spring in the immediate vicinity of the service reservoir which yields a small supply during and immediately after each rainfall. This spring is connected with the service reservoir under the Nalla Tank by a line of 6-inch pipes. But the supply from this source under the present arrangement is so very uncertain that it is left out of calculation. At present, even on the intermittent supply system of about 3 hours in the morning and evening the supply per head of population during the drought period including waste, does not exceed 2 to 3 gallons per head.

5 Such being the conditions, it became incumbent on the Adoni Municipal Council to find out remedies for improving the defects, and the work was entrusted to the Sanitary Engineer to Government whose investigations are detailed below.

There are 4 sources for further increasing the supply, viz.,

- (1) Adding Gangalamanchi catchment area,
- (2) Adding Mutali catchment,
- (3) Adding Ramjella catchment, and
- (4) Restoring the abandoned Mandiguni Tank and pumping the stored water into the Nalla Tank as often as is required.

The Sanitary Engineer to Government who inspected and investigated the several schemes recommended the adoption of the first and second schemes for the present, at a cost of Rs. 25,900, keeping in abeyance the other schemes till the results of the working are known of schemes No. 1 and 2, which are expected to supply about 21 per cent of the requirements under the tank, for, these additional areas are situated on the south-west side of the hills. Government have been kind enough to accord sanction, and have also asked the Municipal Council as to how it proposes to finance the project. The Council at its meeting held on 1st November last resolved to apply to Government for a loan of half the amount and the

remaining half as a contribution from provincial grants, if they could not grant the whole amount. The orders of Government are awaited with the anxious hope that the proposals will be carried out in the coming season so as to have the benefit of the next coming south-west monsoon rains for securing a better supply.

6 The reservoir which was an old irrigation tank had only one small sluice situated at the extreme right end, and this was not found suited for an outlet sluice. It was also considered inexpedient to cut through the bund, and the construction of a new outlet sluice was considered to be very costly. So, the cheap and most desirable method under the circumstances was carried out by putting in the syphon arrangement. The working of the syphon is as follows —“The syphon has a gradual rise to the air vessel and then a fall away from it. A valve with bell mouth is provided for charging the syphon. The air vessel rests on the top of one of the pipes, which has a seat bracket below for resting on a stone foundation. The flange on this pipe on which the air vessel rests is a blank flange and the pipe is not in direct communication with the air vessel, except through the right-angled valve at right hand side of the air vessel, which is provided with gauge cocks and gauge glass also for filling and for recharging air vessel, when air accumulates and water begins to get down. The air vessel will probably require recharging every fortnight or three weeks. The method of recharging the air vessel is as follows —When the water in the air vessel is observed to be getting low by the level in gauge glass, close the right-angled valve, open the valve on the small bell mouth to the left, also the air cock on top. Fill the air vessel full of water, close both cocks and open the right angled valve. The flow through the syphon should be kept as steady as possible. If stopped at any time, air is liable to accumulate and stop the syphonic action.”

7 The lower end of the syphon is connected with the filter beds, constructed below the rear toe of the tank bund.

These consist of three compartments, each having an area of 2,000 square feet with a filtering capacity of about 100,000 gallons daily, or if all the three beds are worked together, there will be available 300,000 gallons of filtered water, at a rate of about 9 gallons per head for a population of 33,500. As it involves, however, the cleaning of filter beds once in a month or so, only two compartments are in use at a time, leaving the third for being cleaned and the rate of supply is consequently only about 7 gallons a day per head of population. These filter cisterns are 9 feet high above bed. The filtering materials consist of a layer of stone metal of $\frac{3}{4}$ " to 1" size for a depth of 1'-6". A layer of coarse sand to a depth of 1'-0", with a 2' layer of fine sand at the top. Water in the filter bed cistern is maintained at 1'-6" below top of cistern wall. A 6" stone-ware pipe runs from each filter bed, to the sluice valve connection outside each cistern. These latter valves control the supply to the service reservoir.

8 The service reservoir is again in three compartments, each measuring 50' x 25', with a corrugated zinc sheet roofing on top. The depth of water in each of the three compartments is 10 feet, and so could hold 12,500 cubic feet or about 158,000 gallons. The outlet pipe from each of the service reservoirs is 8" diameter.

9 There is also a sand washing box, which is connected with the reservoir, as all sand used in the filter bed is cleaned out before use. This is done by placing the sand in the box and admitting water from below. The sand is stirred up and the impurities are washed off along with the overflow water, and when this overflow is seen to flow clear, the sand is then removed and kept up ready for use.

10 The source of supply to Adoni town is situated at a higher level than the town, so the conveyance of filtered water for delivery in the town has been designed on the gravitation system. The 8" main leaving the service reservoir

runs for a length of about 4,000 feet through open fields and from here the supply to the branches begin, the total length of the main and the six submains being about 2 miles, with six other branches, and also a connecting pipe

11 For distribution, which is on the "dead end system," there are eighty taps altogether on the distribution mains with only fifteen house service connections. Of course there is a demand for more house services—but these have been kept back, till a more satisfactory and increased supply is made available in the storage reservoirs. As Adoni is a town with an expanding cotton trade, it is likely that there may be demands for fire hydrants, which will also have to be considered on the results of the future supply expected by the addition of the catchment areas

12 The total original cost of the whole work, was Rs 1,62,000 and its annual cost of maintenance is Rs 2,250. The total cost per 1000 gallons supplied daily is Rs 548.58 or Rs 5-7-8 1/2 pies per head of population of the town. To this cost, the estimated cost of Rs 25,900 of the proposed schemes for enhancing the catchment basin area should be added, and the total when compared with costs of several other schemes in the Presidency appears to be quite favourable to the rate-payers of Adoni town



Malaria and the Mischief done by the Mosquito.*

[BY MAJOR T S ROSS, I M S]

FOR centuries past, man has been annoyed by the mischievous attentions of the mosquito. Long before any hint had been dropped that the mosquito might cause serious disease, man had been in the habit of protecting himself from its bite, because of the unpleasant itching sensation which follows it.

You would imagine that such a cunning little beast as the mosquito would be satisfied with extracting its meal of blood from us, and if it were, we probably should not complain a great deal, but the mosquito must needs add insults to injury, the first result consisting in the injection into our skin of an irritant secretion that gives rise to the itching of which we complain. I believe, however, that for this, the mosquito, like the person in the song, "is more to be pitied than blamed." It simply has to inject this irritating material in order to attract sufficient blood to the part bitten, probably also the secretion enables blood to flow more readily along the mosquito's proboscis or sucking apparatus.

Out of evil, good sometimes comes, and out of this itching secretion habit of the mosquito has arisen the mosquito curtain habit—a habit which has safeguarded the health and lives of thousands—I wish I could say of millions. The amount of inconvenience caused by the mosquito bite is small with many people, so small indeed that they do not consider it worth while protecting themselves by curtains or other devices.

* Being the second of the Popular Health Lectures, delivered at Madras, under the Presidency of His Excellency Lord Pentland. In the unavoidable absence of Major Ross, his paper was read by Major F F Elwes, C.R.M., I.M.S., the indefatigable Secretary of the P.H.L. Committee.

Undoubtedly people get acclimatized or accustomed to the mosquito bite, Europeans on their first arrival in this country often suffer tortures, but in a few years either the mosquito knows they are old hands and avoids them or the sensation caused by the bite has become much less acute. I think that most Indians suffer little from the mosquito bite. This tolerance can be explained on the "artificial production of immunity" theory which I do not propose to dwell upon.

As we shall see by and by, this acclimatization is anything but a blessing. It is indeed a positive curse, for it enables many people to do without mosquito curtains, and so allows the mosquito to inflict its crowning insult, the inoculation of disease germs into our bodies—even while we sleep.

The great and wonderful discovery made by Sir Ronald Ross, that the mosquito can suck up disease germs with the blood of one person and again inject those germs into another person (probably at the time it injects its irritant secretion) is notable not only in itself, but is especially notable in that it laid the foundation for further research in connection with insect transmission of disease, and now we know definitely that not only malaria is caused by the bite of an insect but widely diverse diseases like sleeping sickness, yellow fever, typhus fever, elephantiasis, plague, dengue fever, relapsing fever and probably kala-azar are all conveyed from one person to another by insects. It is also known that several diseases of animals are similarly transmitted by insects.

I shall now confine myself to the diseases borne by the mosquito and the list is not long enough though it makes up in other respects for its abbreviation.

I think I may assume that every schoolboy (even if he is less omniscient now-a-days than in the days of Macaulay) knows that malarial fever is caused by the mosquito bite. It is perhaps not so generally known that filariasis, one result of which—elephantiasis—is so common in parts of the Madras Presidency, is due to the mischief of the mosquito and out of

our list of insect borne diseases there is only one other—fortunately unknown in this country—of which we can say with certainty that it is due to the mosquito, that disease is yellow fever. Blackwater fever is also due to the same insect but I think I may safely say that blackwater fever is but a form of malarial fever.

Dengue fever is also said to be due to the mosquito but of that I am not so certain.

So far as our knowledge goes at present, that is the extent of the mosquito borne diseases but I am not prepared to say that the list is positively closed. It must be remembered that the whole subject of insect transmission of disease is still young. The originator of the theory and the practical demonstrator of the soundness thereof are both still alive and it is quite possible, though I think improbable, that the mosquito will be still further incriminated.

Malarial fever, as you know, is due to a parasite that lives in the red blood corpuscles, this parasite was discovered by a French Army Surgeon named Laveran, in the year 1880. In the year 1894 and again in 1896 Sir Patrick Manson, as he tells us in his excellent book on Tropical Diseases, formulated a definite hypothesis with regard to the way in which the parasite enters our blood.

This hypothesis briefly is this—Being a parasite, the germ of malaria to keep in existence as a species must pass from host to host, in other words it must at some time pass part of its life outside the human body. As the parasite whilst in the circulation is enclosed in a blood corpuscle, it is incapable of leaving the body by its own efforts and is never, so far as is known, excluded in the excreta. Manson concluded that it is removed from the circulation by some blood-sucking animal and this blood-sucker he believed to be the mosquito—an insect whose habits seemed adapted for such a purpose and whose distribution conformed to the well-ascertained distribution of malaria. Please note that this was

only an hypothesis, but Manson suggested to Ronald Ross (then a Junior Officer of the Indian Medical Service stationed in Secunderabad) the desirability of investigation on the lines of this hypothesis. Ross took up the subject with enthusiasm. He got a lot of female mosquitoes (by the way, it is once again a case of the eternal female, males never suck blood) and let them suck the blood of patients suffering from malaria. He then kept the mosquitoes alive in bottles and each day he dissected one or two of them to see if the malaria germs which he knew they had sucked from his patients had undergone any change or development. At first his results were entirely negative, the reason being that he was working with the wrong kind of mosquito, for it is only in a comparatively few species of mosquito that, as we now know, the malaria parasite undergoes development. But Ross was a persevering man. About that time he happened to be going up to the Nilgiris and knowing that the foot of these hills is intensely malarial he stopped to examine and experiment with the kind of mosquito to be found there, his efforts were rewarded, he got hold of a mosquito in whose body the malaria parasite did undergo development and thereafter all was comparatively easy. He published his results which attracted the notice of scientific workers all over the world, these results were speedily confirmed and extended. All kinds of experiments were carried out. Certain Doctors went and lived in mosquito-proof huts in a very highly malarial part of Italy near Rome, where all the inhabitants suffer from malaria. These Doctors drank the same water and lived in the same way as the natives but they took precautions against being bitten by mosquitoes, none of them contracted malaria. They collected a lot of mosquitoes that had sucked the blood of malaria patients and took them home with them to London where various persons developed malaria, among them being Manson's own son, and when their blood was examined typical malarial parasites were seen in their red-blood corpuscles although none of these gentlemen had left London, a place in which malaria does not occur.

This is briefly the story of the discovery that has led to so many other discoveries in connection with insects and disease transmission, discoveries that have almost revolutionized the world.

We now know that within the human body certain of the malarial parasites are asexual and certain others are males and females. The asexual parasites hatch out in the blood and the advent of a new brood is heralded to the human host by an attack of fever. The sexual parasites undergo no further development within our bodies, but when they arrive in the stomach of the anopheles mosquito the female parasites are at once fertilized, as soon as this occurs they attach themselves to the wall of the mosquito's stomach and there each female parasite develops an enormous brood of young ones in about a week (and let us hope that these also are heralded by an attack of fever in the mosquito). When these young malarial parasites are fully developed they burrow through the mosquito's tissues—being excessively minute—and so find their way to the salivary glands which I have seen packed with these young parasites. If that mosquito then bites a person, the young parasites flow down its proboscis with the itching secretion that the mosquito always injects into us and so gain access to the human body. The young parasites then enter red-blood corpuscles where they multiply asexually at an enormous rate, so quickly that in about fourteen days they have reached many millions in number, sufficient in fact to give to the person his first go of malarial fever, and so you see how it is that you may travel through a malarial tract and not develop fever until ten days or a fortnight after you have left it and reached a place in which malaria is unknown. That is the whole life history of the malarial parasite. If the infliction of misery, suffering and death on a multitude of human beings has any right to be called a victory—and apparently it has—then the mosquito has won greater victories than Alexander the Great, or Julius Cæsar or Napoleon or even William II of Germany. It may seem ridiculous to

compare William II with all his chemical science to a mosquito, but even in such a comparison he is still only second

I believe I am right in saying that both Alexander the Great and Julius Cæsar retired as casualties before the onslaught of the mosquito

The amount of misery and suffering and death caused by the mosquito in India in any year is exceedingly difficult to calculate. No record is kept of sickness among the civil population. The registration of causes of death is still far from being accurate. It is however unfortunately not necessary for me to produce an array of figures to convince a Madras audience that malaria is responsible for an enormous amount of sickness and debility and even of mortality. Many of the inhabitants of this city have in the last few years had abundant proof of this in their own persons and there was a considerable outcry that Government or the Corporation should rid the city of this pestilence. It is a good and hopeful sign of the times that such a demand should have been made, it is an admission that disease can be combated by human agency. But in connection with a disease like malaria, spread by such an elusive creature as the mosquito, I would like to lay emphasis on the fact that the eradication of the mosquito and so of the disease is more a matter for each individual citizen than for any corporate body. Both Government and the Corporation have come handsomely to the assistance of the people in their affliction, yet even in a limited area like the City of Madras, and with abundant resources of Government and the Corporation at their disposal, the malaria staff have found no little difficulty in carrying out, with necessary thoroughness, the measures which they know will rid the city of malaria. How great therefore is the problem of freeing all the afflicted parts of the Presidency from malaria may easily be judged.

It may occasionally but very occasionally happen that Government is able by an order and the expenditure of some money to free a place of malaria, as for example by the

diversion of a stream or channel or by the breaching of a tank, but such a measure is ordinarily impossible, and where possible is unpopular in this country where the proximity of water is the greatest blessing. Water the people must have in and around their villages and towns and it is in water and only in water that the mosquito lays its eggs, and in the water the eggs hatch into larvæ known as wigglers or *tann pooches*, the larva becomes transformed into the pupa still in the water and out of the pupa comes the fully-developed winged mosquito which spends part of its time on the wing and a good deal of the remainder of its time in trying to get through mosquito curtains. Well, we must have water and if we must have water, apparently we must also have mosquitoes and Malaria.

Fortunately this does not follow. I doubt if we shall ever be able to get rid of all mosquitoes but all mosquitoes do not and cannot carry malaria. It is only certain mosquitoes of the *Anopheles* genus that have the power, why, I cannot tell you, but it is so. The common mosquitoes that hatch out in drains and dirty water, the mosquitoes that you all know so well, are unable to spread malaria. That is an important point and one which somewhat simplifies our problem.

The *Anopheles* mosquitoes—the fever carriers—are known roughly by the fact that their wings are spotted and that they assume a characteristic attitude when at rest. They are generally smaller than the common mosquitoes, they are much more cunning, I think, and much quicker in their depredations.

In a malarial place they are easily found when searched for, yet, I doubt if any of you ever saw a malaria carrying *Anopheles* unless you looked for it specially. I do not think I ever have. As I say, they are more cunning than the ordinary mosquitoes, they do not come buzzing round your ear in the same bold defiant manner warning you of their presence. They never, or practically never, bite in

the day-time and at night they avoid the parts of your body on which the light shines. Hence it is that you never see them committing their depredations. Your legs and feet placed, as they often are, under a table, or under a chair, and so away from the light are their favourite points of attack but when lights are out and you have retired to bed, then any exposed part of the body is attacked. Their bites are less irritating, I think, than the bites of the ordinary mosquitoes and infinitely less irritating than the bite of that fiend, the tiger or bamboo or jungle or stegomyia mosquito, the one with the nice white bands round its legs that bites so freely in the day time.

The anopheles mosquito prefers clean water in which to lay its eggs, the clear water of hill streams, the clear pools in the sandy bed of a river, the clear water of lakes, tanks, wells and swamps are its favourite breeding places. On the strip of coast just north of Madras between the Buckingham Canal and the sea, the clear water in the nice shady casuarina pits is a veritable paradise for the anophelene larvæ. The larvæ are liable to be eaten up by numerous enemies from fish downwards. So it is necessary that they should in some way be able to protect themselves from these enemies, that is they must have cover in which to hide and this cover is usually provided by the blades of grass growing into the water from the edges of the stream or tank or by floating debris or by weeds actually growing in the water.

In connection with most evils, prevention is better than cure, it is particularly so in connection with disease. As regards malaria, there are fortunately several methods of prevention. The first and most radical measure obviously is the eradication of the mosquito. As I have said, this is a matter for the individual more than for any corporate body. Let each house-owner or occupier in a town prevent mosquitoes breeding on his own premises—a very small affair indeed, and you have solved the whole problem, and instead of a Corporation malaria

staff of a few dozen persons costing a considerable sum of money, you have at once in this city an army of something like 75,000 people at work and costing nothing. It is just because the problem is so difficult and so expensive for the Corporation, and so simple and inexpensive for the individual that you are appealed to, to do a small amount of work for your own good and for the good of the community.

Now the first thing to do is to do away with all unnecessary collections of water on your premises. Sometimes a disused well, or a small and useless pit, or an old tin bath tub contain innumerable larvæ and pupæ, from which a cloud of mosquitoes hatch every evening. It would not be a great matter to fill up the well and the pit and overturn the bath tub, and the result would greatly add to your comfort if nothing else.

There will however be many cases in which it is not possible to fill the well or the tank. What are you to do then? Fortunately there are still ways of circumventing the mosquito or rather the larva. As I have said, the larva must have shelter from its numerous natural enemies, well, then remove this shelter, remove the floating moss and debris from the well and the weeds and debris from the tank, trim the grass edges of the tank and give the enemies of the mosquito larvæ a chance but I warn you that in temporary collections of water like the bath tub the enemies are not naturally present. In all cases, it is a good plan to make certain that enemies are present in all your permanent or semi-permanent collections of water, and this you do by placing a few of the small fish known as *chilwa* in your tanks, wells, cisterns, &c. You can get small larvæ-eating fish out of almost any tank that holds water permanently. It will of course occur to you that when the water dries up the fish die and a fresh lot must be added when water again collects. For very temporary collections of water such as occur after rain, and also for garden cisterns, disused wells and the like, a weekly application of kerosene oil, is the simplest remedy.

The larvæ and pupæ all die if there is a thin layer of oil on the water, and a bottle of kerosene oil will go a long way. For an ordinary well, a wine glass full of kerosene oil is sufficient.

The kerosene oil evaporates in a day or two but not before it has destroyed all the larvæ. As soon as it has evaporated, the mosquito comes along and lays a fresh lot of eggs in the water and a fresh lot of larvæ hatch out, hence it is that I say the kerosening must be done weekly. In my compound in Tanjore, there were three garden cisterns and a disused well. When I first arrived in Tanjore the house had been unoccupied for sometime, and I was nearly eaten up by mosquitoes on the first night, next morning, I made a search accompanied by a peon with a bottle of kerosene oil, we found the water in two of the cisterns black with mosquito larvæ. We kerosened them all and did so every Sunday afterwards. I was never again troubled by mosquitoes. A peculiar thing in connection with kerosening is that it is quite useless issuing an order that it be done. You must invariably go and see it done yourself, and sometimes you will be rewarded by finding a fresh mosquito breeding place in your compound, that you had never discovered before. I ask anyone who lives in a compound to try this kerosening method. You will be surprised and gratified by the result, not immediately of course but in a week or so, if you do your work thoroughly. It is useless kerosening a big and perhaps harmless tank, and omitting to notice the tins of water in which the legs of a table in your back verandah are placed. Thoroughness is the key-note of mosquito extermination. Perhaps it sounds a petty occupation, well fighting the kaisai is not considered a petty occupation, and the mosquito is just as difficult to fight.

Simple as the whole matter is, I am afraid it will be many a long and weary day before we can hope for the time when every citizen will voluntarily do his duty and enlist for the mosquito campaign, and so we have now got to attack the problem on the assumption that there are mosquitoes—malaria

carrying mosquitoes about. How are we to avoid being bitten and being infected by them? Well, I have told you that the anopheles or malaria mosquito never, or practically never, bites in the day time. That fact has already reduced our problem by at least one half. During the hours of sleep you should protect yourself by mosquito curtains, and they must be mosquito curtains without holes, if you can understand what I mean, and of sufficient fineness to keep mosquitoes out, also, they must be properly tucked in under the mattress all round or else fixed down to the floor by weights all round. All that we have now to consider is the period between dusk and bed time. I am assuming that none of you get up in the morning before day light. How are you going to protect yourself during those hours? That is by far the most difficult part of the whole problem so far as Indians are concerned. If I advise you to wear trousers and high laced boots and so protect your legs and feet from the mosquito, I am asking you to alter your habits and customs and I am sure that even the mighty mosquito will not compel you to do that. There are various chemical preparations or oils, such as lemon grass oil that the mosquito dislikes and if you anoint your legs with some of these you will certainly be less bitten than if you did not. But I have reached such a difficult part of the problem that I must leave the solution to yourselves, my advice is, don't have mosquitoes in your house, and then it does not matter how much your extremities are exposed.

It is said that you can ignore the mosquito and still avoid getting malaria even in a malarial place. This you do by taking quinine and so killing the malarial germ as soon as the mosquito introduces it in your body. In theory this is correct. In practice it is a different matter. To be even partially effective, you must take at least two ten-grain doses of quinine every week and I doubt if there are many people who could keep that up week after week and year after year. I have practised the other method—“the don't-get-bitten-by-the-mosquito method of prevention”, and I have found it

effective and much less unpleasant and unksome than the quinine method

The lazy person tries a combination of both and carries neither out thoroughly and so gets his malaria just the same

The treatment of malaria hardly comes into my paper, but I cannot refrain from saying a word on the subject. Of course, the correct advice to give you is, when you are sick, go to a Doctor. Unfortunately Doctors are not always available in malarial places, I am not sure that they do not try to avoid them! Well then with regard to the home treatment of malaria, there is only one drug and that is quinine. It is not of much importance what salt you use by the mouth. The ordinary sulphate or bisulphate is easily available and perhaps as good as any. I prefer it in sugar coated tabloid form. One point that I want to bring out especially is that if you begin treatment early enough, that is, immediately after your first attack, the disease is easily and permanently cured. Take a purgative and take ten grains of quinine at bed time, take a similar dose of ten grains every night at bed time for six days and then every other night for a week or ten days. If you have begun your treatment immediately after your first attack, that will cure you and it is quite unnecessary to go on taking the drug for weeks, if you have left the malarial locality. Neglected malaria, or malaria that has been allowed to go to the third or fourth attack (that is for ten days or so) is a very different matter and exceedingly difficult to cure. There you certainly must continue taking the drug for weeks, or have it injected in your muscles.

I do not see any object in taking quinine in the morning or during the day, you simply make yourself muzzy, deaf and uncomfortable. Take it at bed time and the unpleasant effect will have passed off when you wake up in the morning, avoid small doses of quinine as you would the evil one, let ten grains be your minimum dose for an adult.

I must warn you that if you still remain in the malarial locality and neglect mosquito-bite prevention, it is quite

possible that in a few days after you have cured your malaria, another mosquito may come along and inject you again and so on until you lose all faith in quinine and end your days in the hands of the quack

I will now say a few words only with regard to the other common mosquito-borne disease of this Presidency—filariasis of which elephantiasis is one of the outward manifestations. Filariasis is due to a small worm the embryos of which circulate in the blood at night

When the mosquito sucks the blood of a person who harbours these, it also draws up some of the embryos. I have seen as many as fifteen of the embryo worms in one drop of the blood of a patient in Cochin. These embryos undergo a stage of development in the stomach of the mosquito. Thence they burrow through the mosquito's tissues and so reach its proboscis. When the mosquito then bites another person, the embryo finds its way into that person's blood and there develops. It is also possible that when a filaria-infected mosquito dies in water, the embryos escape from its body and so a person drinking that water swallows them and becomes infected in that way though I do not think that this has been quite proved.

In connection with malaria, I told you that it is only certain mosquitoes of the anopheles genus that have the power of conveying the disease. But as regards filariasis, apparently any mosquito may carry the infection. In Cochin, mosquitoes of the three great varieties—culex, anopheles, and stegomyia—have been found infected, so that here we have got to wage war on all mosquitoes, that, however, need not greatly exercise you as when you are going round your premises looking for mosquito-larvæ, I do not suppose you will stop to enquire to what caste or tribe the larvæ belong. The common mosquito that breeds in drains and sullage water has long been known as an efficient filaria carrier and you have a right to insist that the street drains which are vested in municipal councils shall

not act as breeding places, that is, they should be regularly flushed out. Sullage cess-pools are contrivances against which I have long waged a more or less ineffectual warfare. They are usually magnificent mosquito hatching-places and nothing else. The sullage water is never regularly baled out of them, and when it is baled out, the *toty* simply pours the water on to the surrounding ground. The Public Works Department, acting on sanitary advice, are particularly fond of these contrivances and as if to make them more efficient mosquito hatching-places they often provide them with a wooden pent roof. I would strongly advise your doing away with all cess-pools on your premises, if there is no drain into which to run your sullage water, let it sink into the ground as far away from a well as possible. This is, I know, unsanitary advice and far from being perfect, but under existing conditions the sullage sinks into the surrounding ground any way, so that the only use of the cess-pool is to breed mosquitoes and produce noxious gases.

Once again I must hark back to the old saying that prevention is better than cure. Prevention of elephantiasis is certainly better and easier and cheaper than its cure, for, as you know, there is no cure for elephantiasis, but do away with your mosquitoes and you will have no more elephantiasis.

Yellow fever—another mosquito disease—is conveyed by the bite of only one variety of mosquito, the mosquito known as *Stegomyia fasciata*. The disease has fortunately never reached this country though we have the agent for its spread, the *stegomyia* in abundance eagerly waiting for the arrival from the West Indies or from West Africa of a patient with the germs of the disease in his blood. It is feared that with the opening of the Panama canal and the greater facility for communication between this country and the West Indies, yellow fever patients may reach India, and so Government ordered a *stegomyia* survey to be made at all the important Indian Ports to determine the presence or otherwise of this

necessary agent for the spread of the disease I believe that *stegomyia* was found at every port As I have said, this mosquito and also some of its very near relatives are well known by various popular names as the tiger-mosquito, or the bamboo-mosquito or the jungle-mosquito It bites in the day time as readily as at night and so you must all know it It is nearly black in colour with bright white bands on its body and around its legs Its larvae are found in temporary collections of water like rain-water cisterns or barrels, old bins and pots and chatties and in the rain water collected in the hollows of trees, which sometimes makes it difficult to track this mosquito down to its breeding place After every shower of rain, stroll round your premises and overturn or smash every old receptacle in which you find rain-water collected, by doing so, you will save yourself from the attentions of the most venomous, that is to say, the most itching mosquito of all

In conclusion, I wish to forestall you and answer the interpellation which I am sure many of you wish to put "If the mosquito gets the disease germs from man, and man gets it from the mosquito, do you know when and where the cycle began"? The answer, like the answer occasionally given to interpellations in another place, is in the negative, I don't know The egg comes from the chicken and the chicken comes from the egg, where did this cycle begin? Heaven forbid that I should venture to speculate on such a problem



Slums and Town Nuisances.

[BY DR M R SAMEY, M D, D P H (U S A),
M R SAN I (LOND)]

THE ideal community would have neither slums nor nuisances, and in consequence its expense for the administration of justice, for charities, and for the correction of social disorders would be at a minimum. This ideal community would provide the highest possible personal efficiency and it may be taken that such is the effort of all modern philanthropic and sanitary work. When we shall have realized that all unnecessary illness, all loss of opportunity for gainful work, all restraint from industry by judicial or other means and the cost of all effort to relieve distress, make up a sum which bears in the last analysis upon every member of the community, we shall begin to see that the slum is a heavy expense to the better portions of the community, and that nuisances concern everybody.

Building Laws and the Slums

So long as no restraint is placed upon the cupidity of the incidental possessor of a portion of the earth's surface on the one hand and upon the stupidity of the unfortunate or careless on the other, slums will exist. It is well understood that a definite relation exists between healthful conditions and the number of cubic feet of indoor space allowed for each individual in a dwelling. But this understanding does not always assume legal shape or have bearing upon the builder or owner of real estate, who calculates his possible income regardless of the future effect on humanity, one of the first things needful in bringing about a state of public sentiment which will produce proper building law and then enforce them, is the understanding that a man who so uses property in his hands as to damage his neighbour now or in the future is working evil and wrong, and is not deserving of public respect. Not unfrequently men of really good intent, whose lives are beyond reproach for the most part, are among the most inveterate offenders in respect to the

contraction of space in which a human being may be expected to exist. Such men should be looked down upon because of their cupidity, selfishness and disregard to public health, and thoughtful communities should safeguard themselves by insistence upon the enactment of such laws as shall provide against the evils of the slum.

It should not be supposed that only the large cities are offenders in this respect. Many of the smaller cities are fully as wrong in this respect as are the larger and more congested cities.

A noted writer on Health opines that the shelter of our houses is responsible for much of the sickness which the medical profession combats. He urges that a point of view be taken under which shelter shall be incidental and the outdoors shall be brought indoors as much as possible. Two primary points may be set down as necessary to be considered in respect to building laws in an efficient community.

The first is that a certain adequate space shall be provided for each individual and the number of individuals permitted to live in any structure erected shall be proportionate to that space. The second is that such buildings shall be so arranged with respect to the access of light and air as to make it possible to bring the outdoors indoors.

It may fairly be said that we have a right to expect of the owner of a property that he shall not undertake to put upon it dwellings which will produce citizens who become a burden to fellow-citizens through ill-health or immorality resulting from ill-health. It is also reasonable to expect that the authorities of a township will be willing to enact and enforce building laws which reduce to a minimum the burden arising from ill-health and immorality.

Manure and Factory Refuses

The prevailing commonplace idea that all that is necessary is to get rid of wastes in an easy way must be given up and the practice of the housewife depositing the ashes resulting from her use of fuel or coal in the nearest highway, and the

factory dumping its refuse in convenient places, taking account only of the way in which such refuse might interfere with its own operation in respect to access to its premises must be stoutly discouraged and interdicted

From the standpoint of public hygiene, the main objection to the thoughtless disposition of stable refuse, here mentioned as manure, is the long-time unnoted fact that the common house fly finds its most favorable breeding place in manure, particularly horse-manure. Since it has been discovered that the house fly is an efficient disseminator of disease germs, and not a scavenger doing good work, the disposition of manure becomes distinctly of importance

No man has a right to injure his neighbour by any of his own acts and in accordance with this well-known theory, manures of all sorts should be so cared for as to be completely inoffensive, either from odour or as breeding places for insects. If kept in well-screened and tightly closed pits, and if hauled away from cities at frequent intervals, and if these stables are in themselves kept clean, there should be little difficulty. If, on the contrary, there is neglect of the simple sanitary necessity of preventing the breeding of injurious insects, by reason of neglect to safeguard the handling of manures, then a serious and distinctly dangerous nuisance results

It is cognate to the subject to say that modern agriculturists insist that manures may properly be disposed of without being subjected to the process of rotting, long supposed to be necessary. As to factory refuses, there can be no proper question as to the necessity for insisting that they be so cared for as not to interfere with the lives, the health, or, indeed, the comfort of a populace

The house fly and the mosquito are positive nuisances. They are known to be preventable, and the presence of both or either in any considerable numbers is disgraceful in any civilized community

As a disseminator of typhoid and other diseases, and especially as connected with its influence on infant mortality

in hot weather, the house fly is a deadly and desperate menace. The investigations of the Merchants' Association of New York have shown that the infant death rate in that great city follows closely the rise of the number of house flies. As the flies increase, the babies die, as the flies die, the babies live.

The house fly, it is well known, breeds only in filth, particularly in horse-manure, as has been above suggested. The removal of filth and the proper handling of horse manure will soon eliminate this dangerous nuisance.

The mosquito is known in its various species to be the disseminator of malarial diseases, and in certain localities, of yellow fever and other germ diseases. It is known also to breed in stagnant water, and its presence in any community is an evidence of sanitary neglect. The success which has followed energetic endeavour to free from mosquitoes—both malarial and ordinary—certain localities in other countries shows that any community can be rid of this buzzing nuisance. It is not amiss to mention that they rarely fly to any considerable distance. Hence breeding places may best be looked for immediately about the premises affected. A hoot-print, a choked roof gutter or rain spout, a discarded tin can, or any little puddle may, in a week or two in hot weather, afford breeding opportunity to a horde of offensive mosquitoes. To screen the house is an excellent method of defence, but a better method is to prevent the breeding of the mosquitoes by drying up the stagnant pools, wherever they may be found, in which they live to generate, or by covering with a thin film of petroleum the water-holding vessels which cannot be otherwise treated, thus killing wigglers as they rise to the surface to breathe, and by generally seeing to it that the necessary conditions for mosquito life are not provided.

It is a mistake to insist that trees or shrubbery afford breeding places for mosquitoes. This is in no case true, but it is true that when mosquitoes have been bred somewhere through the provision of the necessary stagnant water, the trees and shrubs afford comfortable lurking places for them.

The Madras Exhibition.

The Health and Hygienic Section

One of the most interesting Sections in the Madras Exhibition was that of "Health and Hygiene." So far as we know this is the first systematic attempt made in this part of British India* to bring home to the popular mind in a concrete and living way the ideas on health and sanitation that Western doctors and sanitarians have till now tried to spread by means of speeches and writings. Ordinarily, in more advanced countries, it would be the duty of Municipalities or voluntary associations to propagate these ideas. In the absence of any such effort, the public have reason to be thankful to H. E. Lord Pentland for filling up the gap by organising this section.

The aim of this section is to illustrate

(a) how people may live in comfort in properly built houses at reasonable cost, (b) how the individual may protect himself from certain common diseases of India, (c) how the lives of many are destroyed in early life through living in unhealthy surroundings, and (d) how the lives of many people may be prolonged by living in healthy surroundings under the best possible hygienic conditions. This was sought to be achieved by means of —

(i) A model Indian village, or more correctly, a number of model Indian dwelling-houses and other typical model buildings

(ii) Models in clay of miniature Indian villages, good and bad, healthy and unhealthy

(iii) Lectures on the common diseases of Southern India

The Model Village

In this village many interesting points were noticed

(a) On the north-east of the village was a model well worked by a pulley, rope and bucket, and by a rotary hand

*For an account of the Baroda Health Exhibition, see the L. S. G. G., Vol. I, p. 418.

pump which could be worked by a child. The well was lined with cement down to the summer water level. Around the well there was a cement platform to collect spilt water with a lead off cement drain connected to a filter trench.

(b) North of the well there was a pavilion in which were exhibited models of village house, etc.

(c) South of the well was shown a model system of sewage disposal. This was erected by the workmen of the Buckingham Mills.

South of the village was seen a Model Village Dairy. It was suggested as a simple and inexpensive type of dairy suited for erection in villages. The building was about 10 feet square, but the size is open to modification. On the sides of the building a platform was constructed on which vessels containing butter and milk would be placed. All the openings had fly-proof screens.

In the centre of the village were six town houses suited for erection in a town. At the back of the houses and between the two rows of houses there was a conservancy lane. The centre house in each row was provided with a complete system of drainage and water supply.

In the north of the village was a typical complete village house. On the north-east side of this house there was a model Hindu house. On the other side there was a model Muhammadan house.

The "model houses," designed as they were by Europeans, may not, in all respects, conform to Indian tastes and requirements. But they certainly suggest ideas on the subject of light and ventilation and sanitation.

On the north-east side of the village, a model cattle-shed was put up, and near by this were model Police houses.

Another interesting feature was a model tubercular shed situated in the west of the village for the open air treatment of persons suffering from tuberculosis, in the south of the

village and next to the large court of the exhibition was the village Bazaar

Models in Clay.

A —A GOOD HEALTHY VILLAGE MODEL

The special features of this good or healthy Village Model are as follows

- 1 Well arranged and ventilated houses with properly aligned streets with a drainage system
- 2 Provision of public latines away from village proper
- 3 Drinking water wells with parapet walls, pulleys, cemented surroundings and lead-off drains
- 4 Liberal provision of street lamps
- 5 A properly constructed school, Post and Telegraphic office and other public buildings
- 6 Separate water troughs for cattle
- 7 Separate cattle ponds
- 8 Provision of dust bins
- 9 Market with provision stalls, etc
- 10 No stagnant pools or water-logged areas within the village precincts

B —THE INSANITARY VILLAGE MODEL

The following are very noticeable defects —

1. No public latines—and accordingly very insanitary places anywhere and everywhere,
- 2 Rubbish and dung heaps thrown indiscriminately in several places—frequently near habitations, and providing breeding grounds for flies, which carry diseases like cholera, dysentery, etc, and infect the food of the people
- 3 No regular streets nor lanes
- 4 No lighting

5 Houses ill-arranged, some left half-finished, some dilapidated and much neglected

6 Drinking water wells without parapet walls and lead off drains or pulleys—surroundings water-logged When rain falls, the washings of this grossly polluted ground runs into the well

7 Wet cultivation and pools of stagnant water near the houses providing breeding places for mosquitoes which carry Malaria and Elephantiasis

8 Cattle-sheds among dwelling-houses

9 Roads unswept no scavenging done

10 Considerable encroachments on public roads

11 Step-wells open to all the inhabitants alike, including persons suffering from leprosy, guinea-worm and other diseases

Popular Lectures Illustrated with Magic Lantern and a very large collection of photographs and pictures

In the Lecture Hall in the Central Court of the Exhibition, lectures were delivered on the sanatorium treatment of tuberculosis, on malaria and mosquitoes, and on the milk supply of Madras. In this Lecture Hall, some excellent pictures illustrating some of the common diseases of India, such as plague, guinea-worm disease, ordinary tuberculosis, malaria and snake poisons were also exhibited.

On the subject of *plague*, among the many interesting pictures, were seen the examination of rats at the Bombay Bacteriological Laboratory, how the people become infected with plague from rats, how the construction of Indian houses favours the spread of plague, the method of preparation and manufacture of vaccine, of administration of vaccine, etc.

Guinea-worm—The pictures illustrating the guinea-worm disease showed how the young guinea-worm grew and developed inside the body of the water flea and were then ready to infect man, individuals drinking infected water, the treatment of guinea-worm disease, etc.

Consumption ---There were pictures showing the cause and results of this disease and the excellent sanatorium treatment provided in certain parts of India and elsewhere, also pictures showing the working of a Tuberculosis Institute, such as is to be started in Madras as a memorial to the late King Edward VII

Malaria ---Any Public Health Exhibit in India would be incomplete without pictures of mosquitoes. There were accordingly pictures showing the different kinds of mosquitoes capable of carrying malaria and those which do not carry malaria, typical breeding places of the mosquito, diagrams showing the phases of life of the malaria parasite both in man and in mosquito, mosquitoes which are responsible for spreading malaria outside the town in the country, mosquito-proof houses and huts so protected as to make them mosquito-proof. There were many other interesting facts to be seen in this section.

Snakes and Snake poison ---Pictures showing how poisonous snakes may be captured, the method of collecting poison, pictures showing the various types of poisonous snakes and those common to Madras and other interesting facts were exhibited.

The above is an imperfect account of what was to be found in the Health and Hygienic Section of the Exhibition. Judging from the very large number of men and women who flocked to see it and from the careful attention it received, we have little doubt that the organisers deserve to be congratulated on the success of their efforts. Two features struck us as specially noteworthy, *viz*, first, the large number of Hindu women who visited the Exhibition, and secondly, the fact that several visitors paid repeated visits to it, showing that they made an intelligent study of the exhibits. It is certain that the Exhibition has made a striking impression on the public mind and that from more points of view than the merely spectacular.

We trust that H. E. Lord Pentland's novel and successful experiment will be repeated year after year, as this is one of the best means by which the public can be educated in sanitary ideas

Reviews.

Local Self-Government in Bengal.*

WE have much pleasure in acknowledging the receipt of a small pamphlet by the Hon'ble Surendra Nath Roy entitled "Some thoughts on Local Self-Government in Bengal." We have read it with interest as it serves to show how the problems which are now before us in the Madras Presidency are viewed in a sister province and how the solutions proposed are more or less similar. The plan of the booklet is very simple, it consists of a brief historic survey of the development of local institutions, grouped under the two main classes—rural and municipal. Under the former come the District Boards, Taluk Boards, and Unions. Under the latter, the District Municipalities and the City Corporation. After the brief and very tentative historic resumé, is given what we may, somewhat flippantly, call the "chits" or certificates of character of each of these groups, given by the Government of Bengal in their annual reviews. Then come the suggestions for action, which are all more or less on the lines usually advocated by publicists in this Presidency. The arguments adduced by the author are generally sound, sober and level-headed. The author evidently considers it necessary to have the District Magistrate as the head of the District Board but says that it may be politic to leave the chairmen in a few selected boards to be elected. He pleads for more freedom of action and more assured income for the Taluk Boards. Above all, he pleads

* Some thoughts on Local Self-Government in Bengal. By the Hon'ble Surendra Nath Roy, Vakil, High Court, Calcutta

for the rapid creation of Union Panchayats. The history of the Union Panchayats in Bengal is typical of the doings of what Charles Dickens has so scathingly described as the circumlocution office. From 1882 up till this year, special reports and proposals have been put forward on this subject, and reams of criticism for and against have been written, and yet the net result has been the creation of 61 Unions in a period of 30 years! The latest addition to this literature is found in the District Administration Committee's Report, and we may hope that H. E. Lord Cairnmuir will now stop the creation of more literature and take to the hobby of cultivating more panchayats. The author evidently wants these panchayats very badly, for he thinks that they will help the villagers to fight against the scourge of malaria which is sapping the vitality of the Gangetic Delta.

In regard to district municipalities, the author pleads for further decentralisation and for giving these bodies more freedom to commit mistakes and profit by them. In the matter of the City Corporation, he thinks that a trial should be given to the Bombay system.

We welcome this little book, such as it is. We would have been more profited if the author could have given us a more personal account of his experiences as a member of these local institutions. We have the official blue books and reviews and reports, which tell the story of Local Self-Government from one point of view. But that is not, we believe, the whole story. There is the other point of view—of the intelligent citizen who has to play a part in their working and whose outlook is not the same as that of the “sun-dried bureaucrat.” Such an account the author, with his varied experience, was best fitted to give. We hope he will give us another pamphlet of the kind we have indicated—one which will be full of facts of personal observation and experience and one too which will be sparing in the rhetorical presentation of opinions.

Road-making and Tarring*

The advent of motor cars has made the problem of road-making more difficult of solution than ever, and the large volume of public dissatisfaction at the condition of public roads has necessitated increased attention being given by Municipalities to the making of roads. Road-making is, however, still in the experimental stage even in the Western countries, the chief difficulty being not merely to find out the most suitable material for particular classes of roads but the best means of utilising it. As in other departments, a great deal of close study and specialisation are necessary for arriving at satisfactory results, but few Indian Municipalities can afford the luxury of a special Road Engineer. Even in wealthy Bombay, there has been considerable hesitancy in appointing a Road Engineer and when the recommendation of the Municipal Commissioner to appoint an Assistant Engineer to be in charge of roads came up at a recent meeting, the Corporation referred it back to the Roads Committee.

We, therefore, gladly welcome Mr. Hensman's *Notes on Road-making and Tarring* in which he records the results of his long and extensive experience of road-making. It is a valuable little book giving useful information to subordinates in charge of road construction and repair work and if the hints given are faithfully adhered to, it is sure to bring about satisfactory results. The bibliography given at the end of the book increases the usefulness of the publication.

Town Planning Lectures.

Mr. H. V. Lanchester, Town-planning Adviser to the Madras Government, is delivering a course of twelve lectures on Town-Planning at the Madras Engineering College. A

* Notes on Road making and Tarring By J. E. Hensman, Assistant Engineer, Corporation of Madras. G. A. Natesan and Co. Price Re 1.

practical class is also being held for the benefit of Municipal Engineers. The subject matter of the lectures is as follows —

- (1) The Ethics of Town-planning
- (2) Civic Survey Methods
- (3) The Economics of the Civic Survey
- (4) Historical Study of Town-planning
- (5) Tradition and City Development
- (6) City Life and Housing
- (7) Commerce and Traffic
- (8) Contrasts—European and Indian Cities
- (9) Problems in India
- (10) The Uses of the Town-planning Act
- (11) The Technique of City Improvement
- (12) Madras City

A squalid quarter deteriorates a lot of people just as much as a squalid home degenerates a family, and while the former depresses in the mass, the latter degrades in the home. What I want to urge is that if you can bring right to the hearts and minds, and above all, the intelligence of landowners, of aldermen, councillors, ratepayers, and tax payers the prescience, wisdom and ultimate profit of Town Planning, it will make safe its ultimate success — John Burns

Local and Municipal Notes.

[Bombay.]

Surat Municipality.

FREE SCHOLARSHIPS IN MUNICIPAL SCHOOLS —The Surat City Municipality has passed the following resolution —That the full free-scholarships of 15 % to Hindus and others in all the Municipal Primary Schools sanctioned in 1903 be raised to 50 % and the necessary sanction of the educational authorities be obtained thereto

Bombay Corporation

ENCOURAGEMENT OF PUBLICATIONS.—The Corporation has approved of the proposal to contribute Rs 1000 from Municipal funds towards the expenses of publishing a book called "Milk Problem in Indian cities" by Dr E L Joshi, Bombay Municipal Analyst, on the understanding that 100 copies of the book will be supplied to the Municipality free of cost and that the sale price of the book shall not exceed Rs 5-8 per copy

[Bengal]
Calcutta Corporation

SHIFOGRAPH MACHINES — The General Committee of the Calcutta Corporation has sanctioned the installation of a Shifograph Machine for the preparation of rate bills, at an estimated cost of Rs 8,430 *

Cossipore-Chitpore Municipality

CONTROL OF MILK SUPPLY — With reference to the circular issued by the chairman of the Calcutta Corporation on the subject of the power to be given to the Calcutta Corporation to license and control cow-sheds and dairies outside Calcutta, which supply

* The following note by the Deputy Chairman explains the advantages of the shifograph machine —

Briefly the machine provides a means for printing off rate bills and the necessary lists at a very rapid rate from cards prepared on thin vellum for the purpose

The number of bills issued quarterly amounts to just under 90,000 and it is proposed to indent for an installation containing 1,00,000 cards. The card index will be kept up as the Assessment Register in the Bill Department is kept up. The average number of changes of all sorts in the Assessment Register during the last four years is 23,000. The greatest number is 27,000. For the purposes of calculating the work to be done it is assumed that there will be 30,000 changes a year. This will allow of a liberal margin. In addition to keeping up the index the clerks in charge of the installation will have to print off the bills. This involves two sets of bills and two lists, or 8,60,000 impressions a quarter. A skilled man can print 1,000 impressions an hour or say 7,000 a day. He can prepare 4,000 new cards a day. The quarter's work would therefore take a skilled man 52 plus 19 days a quarter, or two men 36 days each a quarter, or 12 days a month. Of course our men will not be skilled at first but the machine is exceedingly easy to work and there should not be the least difficulty in getting two men to deal with the work with ease after the system is once in order.

At present bills are in preparation for six weeks before they are ready for issue. This means that at the time of delivery the numerous corrections which have been made in the Assessment Register in the interval have to be corrected. Under the new system corrections to the register can be stopped for the very few days during which the bills are being printed and this means that the work of composition is enormously reduced.

The Bill Branch of the Assessment Department consists of 16 clerks and five duffries. It costs approximately Rs 8,000 a year. I estimate that it can be reduced to two clerks and two duffries costing about Rs 2,000 a year.

I also anticipate that the machine will be of great use in the license and Water Works Department and the installation is such that it can be split up or added to without the least trouble.

The estimated cost of the installation comes to £ 562 or Rs 8430. I anticipate, as pointed out above, that the saving in the Bill Department alone will be Rs 6,000 a year to which must be added the saving in leave arrangements and provident fund contribution, to say nothing of possible savings in other departments. So it is clear that the capital cost will be recovered in little over a year and possibly even quicker.

milk to Calcutta, the Cossipore-Chitpore Municipality, after a prolonged discussion and upon a consideration of the Health Officer's Report* passed the following resolution —The Commissioners are quite willing to co-operate with the Calcutta Corporation in the matter of securing a pure and sufficient supply of milk for the city and suburbs of Calcutta, but inasmuch as no practical scheme has as yet been matured, whereby the object in view can be reasonably expected to be reached, they would prefer to await further developments and determination of details before they could come to a definite resolution on the subject

[Madras]

Erode Municipality

LOAN FOR WATER WORKS —The Erode Municipal Council has applied for a loan of Rs 47,000 from Government under the Local Authorities Loans Act, 1914, for meeting a portion of the cost of the Erode Water Supply Scheme. The estimated cost of the whole scheme is Rs 3,99,000

* The following is the report of the Health Officer of the Cossipore-Chitpore Municipality —

As the Calcutta Corporation is going to start Municipal dairy farm and to provide land in connection with the fair to the Gowalas on a nominal rent and with security of tenure, the transference of control of the cow sheds of this Municipality to the Corporation will, I believe, be a boon to the public, only I would suggest, that it would be much better if instead of land for constructing the cow sheds, the Corporation could construct a sufficient number of cow-sheds built in accordance with the plan and let them out to the Gowalas at a reasonably low rent, as otherwise the latter may find the initial cost too heavy for them to carry on the business. In our anxiety to secure purity of milk we should not lose sight of the fact that sufficiency of supply is of no lesser importance, the cost of produce is already high enough, an indispensable necessity of life as it is, with the price ruling at 4 seers per rupee, it has already become a luxury. I am afraid any step which will increase the expenses of the Gowalas will inevitably make the milk dearer still and will thus defeat the very object of the improvement, effect of scarcity of milk on the health of infant and juvenile population can well be imagined. With not only grazing land and dairy farm but with sanitary cow sheds built at the Municipal cost and let out to the Gowalas at a cheap rate, we should be securing not only purity but also sufficiency of milk and there will be no excuse on the part of the Gowalas to increase the price of the commodity.

As to the rules, they are practically the same as the set of amended rules which I have already submitted to the Commissioners. With Municipal cow-sheds available to the Gowalas at a low rate and with the 1st class Magistrate of the Calcutta Corporation trying the offenders, there will be no difficulty in enforcing them.

Kumbakonam Municipality

LOAN FOR WATER WORKS IMPROVEMENTS —The Kumbakonam Municipal Council has applied for a loan of Rs 11,250 from Government under the Local Authorities Loans Act for sinking a second bore-hole near the Mahamakham tank. The estimated cost of the work is Rs 22,590. The loan is to be repaid in seven years in equal instalments of Rs 1875 per annum inclusive of interest.

[Mysore]

Bangalore City Municipality

IMPROVEMENT TRUST BOARD —The Bangalore City Municipal Council has approved of the proposal to appoint a Trust Board for the Bangalore City to inaugurate and supervise the improvement works in the city.

Chikballapur Municipality

IMPOSITION OF OCTROI —The Municipal Council of Chikballapur have resolved to impose octroi and the draft byelaws framed in connection therewith are published in the **MYSORE GOVERNMENT GAZETTE**.

Kolar Gold Fields Sanitary Board

NOMINATION OF A NON-OFFICIAL INDIAN MEMBER —With reference to the Revenue Secretary's Communication calling for the views of the Sanitary Board in the matter of giving one of the seats on the Board to a non-official Indian member, the Board passed the following Resolution —The Board think that there is no necessity to have a non-official Indian member but have no objection to the additional nomination of such a member provided there is another official member to balance him and provided the nomination of the non-official Indian member is made on the recommendation of the President.

[United Provinces.]

Sahasevan Municipality.

USE OF NIGHT SOIL AS MANURE —The Municipal Board of Sahasevan has passed a rule that "night-soil shall not be used as manure in any land within the limits of the municipality unless it has been buried in shallow trenches for four

months and the permission of the board obtained in writing for its use."

Asansol Municipality

WIDTH OF IRON TIRES OF CART WHEELS —The Asansol Municipality (Buidwan District) has passed the following by-law —No bullock-cart shall travel on any road within the limits of the Asansol Municipality unless the iron tyres of the wheels, or (in the case of carts not having iron tyres) the wooden rims of the wheels, are two inches or more in width provided that this by-law shall not apply to carts owned by residents of districts other than the Buidwan District which do not ordinarily ply within the Asansol Municipality, but merely pass through that municipality

[Punjab]

In supersession of Punjab Government notification No 40, dated 10th February 1909, and in accordance with the provisions of section 31, sub-section (7) of the Punjab District Boards Act, XX of 1883, the Lieutenant-Governor is pleased to notify the following direction passed by the district board of Gujranwala under section 31 (b) of the District Boards Act, 1883 —

Resolved that a tax equal to the Chaukidai tax, *i.e.*, Rs 324 per annum, imposed under section 39-A of the Punjab Laws Act, 1872, be imposed in the village of Nizama-bad in the Wazirabad Tahsil. In accordance with the original proposal set forth in resolution No 2 of the 1st November 1914 and modified in resolution 29 of the 7th July 1915, it is further resolved that Rs 36 of this tax shall be specially contributed by proprietors of land, and the balance of Rs 288 shall be assessed on them and other inhabitants of the village alike on the basis of the assessment of Chaukidai tax realized under section 39-A of the Punjab Laws Act, 1872. The proceeds of the tax, including the special contribution of Rs 36 by proprietors of land, shall be credited to the general revenues of the Board, but the special expenditure on the area so taxed shall be such as on an average of years shall be not less in amount than the proceeds realized and collected from that area

The proceeds of the tax shall be devoted to sanitary improvements in the village as follows —

1	Measures for conservancy and scavenging	} Rs 324
2	Provision of water supply	
3	Drainage and street paving	

Subject to the general control of the Board the administration of the tax and the expenditure of the proceeds thereof shall rest with a local sanitation committee to be nominated each year by the district board. Such local committee shall consist of a president and three members, all of whom shall be residents of Nizamabad, and at least one of whom shall be a member of the proprietary body.

It is finally directed that the tax shall be imposed in accordance with the above proposals, and shall come into force with effect from the 1st January, 1916 [G. Notification No. 306, dated 18-12-1915]

Public Health and Sanitation.

Danger from flies.

The attention of householders is called to the danger of the common fly as a carrier of disease.

It is known that flies may carry the infection of Consumption, Typhoid Fever, Diphtheria, Diarrhoea and other diseases, and by contaminating milk and other foods, often give rise to these diseases in human beings.

Flies breed at an enormous rate in filth and refuse of all kinds. One fly may have millions of descendants in the course of a single summer.

It is most important, therefore, that no manure, refuse or decaying material should be allowed to accumulate near dwellings.

Flies only breed in dirt and filth—the cleaner the house and its surroundings, the fewer the flies.

To Prevent Flies Breeding

- (1) Do not let refuse lie about
- (2) Dustbins should be kept covered and the contents should be kept dry. Slops and wet substances should not be thrown into dustbins
- (3) If there are stables near the house, the manure should not be allowed to accumulate, but must be removed frequently
- (4) Do not allow dirt to accumulate in corners, etc. Keep the kitchen and places where food is stored scrupulously clean

Storage of Food

All food, and especially milk, should be kept in a cool place, covered or so stored that flies cannot get at it

Do not eat food that has been contaminated by flies

How to get rid of flies.

Strict attention to cleanliness will prevent the fly nuisance, but where flies have appeared they may be destroyed by one of the following methods —

- (1) By placing fly traps about the house
- (2) By the use of sticky fly-papers or tapes
- (3) By exposing in a shallow dish or saucer a mixture containing two teaspoonfuls of formalin (purchase from any chemist) to a pint of water to which has been added a little sugar

Formalin is poisonous and should be placed out of the reach of children

Water Supply.

A Simple Water-Sterilising process

WATER sterilisation by means of the ultra-violet rays has long since passed from the laboratory stage to practical application, many municipalities upon the continent having introduced elaborate equipments for purifying domestic water in this manner. At a recent meeting of the Academy of Sciences in Paris, a French investigator intro-

duced a new and simplified application of this process, which has aroused considerable interest. Monsieur Billon-Dagurie, the scientist in question, has perfected his system, and it should prove extremely useful in connection with the sterilisation of water for consumption upon the battle field, although it is equally applicable to any other conditions where pure water is demanded. In this process the water is made to flow in a very thin sheet or film over a surface, and during the passage is exposed to intense ultra-violet radiation, the outstanding feature being that the treatment takes place immediately before the water is drawn off for use. The apparatus may be placed in the ordinary or other tank, and includes a special outlet of T-shape made of pure transparent quartz, provided with a window or slot. A mercury vapour lamp is placed in the pipe so as to occupy this slot, consequently the water in passing to the outlet must first traverse the surface of the lamp, and thus become exposed to the maximum ultra-violet radiation. The process was subjected to exceedingly searching tests. The water to be treated was drawn from the Seine below Paris, and was further contaminated with germs of cholera and diphtheria. Indeed, every effort was made to render the water under test as poisonous as possible. The germ-contaminated water was then drawn off in the usual manner, being induced to flow over the lamp, and upon withdrawal was found to be absolutely sterile, all contagious germs having been completely destroyed as a result of exposure to the ultra-violet rays. The test was sustained for a prolonged period, but it was discovered that after three thousand hours' continuous operation the water was as germ-proof as the first gallon withdrawn. The process is extremely economical in operation, and the apparatus cheap to install. The output can be varied to meet requirements, the practice being to increase the number of lamps proportionately to the hourly consumption of the water, but two quartz mercury lamps suffice for treating a flow up to two thousand five hundred gallons per hour. When the consumption is below one thou-

sand gallons per hour one lamp suffices. For field installations it is pointed out that it would only be necessary to mount the delivery tank upon the deck of a motor-car, using the engine to drive a small dynamo to feed the lamp or lamps with the necessary current. Seeing that the automobile has been adapted to operate searchlights by the aid of the car's own engine, its application to water sterilisation should prove equally simple —
Cham Jou

Government Orders and Notifications

[Madras*]

PROHIBITION OF MUNICIPAL HEALTH OFFICERS FROM PRIVATE PRACTICE —The Government have considered the question of allowing Municipal Health Officers to undertake private practice and have decided that rule 4 of the rules issued with G O 1569 M, dated 29th September, 1915,* prohibiting such practice need not be modified for the present [G O No 1915 M, dated 2nd December, 1915]

LOCAL AND MUNICIPAL LEGISLATION —The Government have under consideration the amendment of the Madras District Municipalities Act of 1884. All Municipal Councils are requested to submit through the Collector of the District any suggestions which they may wish to make in the matter. The Government would especially desire to be favoured with suggestions as to the improvement of the financial resources of municipalities. Replies to this reference should reach the Government before 1st February, 1916.

The Collector will be requested to obtain and transmit their remarks within the time mentioned, adding any suggestions which he may wish to offer [G O No 1920 M dated 2-12-15]

The Government have under consideration the amendment of the Madras Local Boards Act of 1884. All District Boards are requested to submit any suggestions which they

may have to make in the matter. The Government would especially desire to be favoured with suggestions as to the improvement of the financial resources of local boards.

Replies to this reference should reach the Government before 1st February, 1916 [G O No 1778 L dated 3-12-15]

[Bengal]

SANITATION COMMITTEES—In exercise of the power conferred by clause (n) of section 138 of the Bengal Local Self-Government Act of 1885 (as amended by Bengal Act V of 1908, which was extended to Eastern Bengal by Bengal Act I of 1914), the Governor in Council is pleased to make the following rules to regulate the duties and powers of Sanitation Committees constituted under section 91 of that Act (as so amended) —

Definitions.

1 In these rules—

(a) “the Act” means the Bengal Local Self-Government Act of 1885, as amended by Bengal Act V of 1908 and

(b) “section” means a section of the Act

2 The Sanitation Committee shall advise the District Board in all matters relating to the improvement of sanitation in the district

3 The Sanitation Committee shall exercise such of the following powers of the District Board as may be delegated to it by that Board, namely —

(a) any powers conferred by section 88 or section 89,

(b) the power to supervise the work of the Sanitary Inspector appointed under section 91, sub section (4),

(c) the power conferred by section 104 of controlling the exercise by a Union Committee of any of the powers conferred by Chapter III of the Act in respect of sanitation,

(d) the power conferred by section 104 of taking direct control and administration of the matter of dealing, under clause (d) of section 118A, with any tank,

- well, pool, ditch, drain or place containing or used for the collection of, any drainage, filth, stagnant water or matter likely to be prejudicial to health- by draining or cleansing it, or otherwise preventing it from being prejudicial to health, but not so as in any case to interfere with any private right,
- (e) the power conferred by the proviso to section 115 of undertaking arrangements for the sanitation of fairs and *melas* held within a Union,
- (f) any powers conferred by rules made under the concluding portion of clause (g1) of section 138

Consideration of schemes for rural sanitary improvement

4 All schemes for rural sanitary improvement must, before adoption by the District Board, be considered by the Sanitation Committee

Allotment of money to Union Committees

5 The Sanitation Committee shall allot to Union Committees, for such sanitary works as it may consider necessary, any money placed at their disposal by the District Board for that purpose

Supervision of expenditure of Union Committees

6 When the power to control the exercise by a Union Committee of powers in respect of sanitation has been delegated to the Sanitation Committee by the District Board, the Sanitation Committee shall see that the money allotted to such Union Committee for purposes of sanitation is properly expended

Outbreaks of epidemic disease

7 The Sanitation Committee shall take such steps as it may deem necessary in order to prevent or to stamp out severe outbreaks of epidemic diseases

Distribution of medicines

8 The Sanitation Committee may take steps, through the teachers and *guru-pandits* of schools and *pathshalas* maintained or aided by the District Board or the Government, to encourage the the extended use of quinine in malaria-stricken places, and may supervise the distribution of potassium permanganate, not only for the purifying of water when cholera breaks out, but also as a cure for snake-bite.

9 The Sanitation Committee may take such steps as it may consider necessary to prevent the sale of articles of food or drink which are unfit for human consumption, or the sale by a leper or by any person suffering from an infectious disease of any article of food or drink which is intended for human consumption

10 The proceedings of the Sanitation Committee shall be recorded in writing, and a copy thereof shall be submitted to the District Board and the Sanitary Commissioner [G O No 947 San dated 14th December, 1915]

Legislative Intelligence.

[Bombay]

THE Hon'ble Sardar Syed Ali El Edroos asked whether it is proposed to arrange for boring wells at villages where scarcity of water is badly felt?

Government replied that in view of the shortage of rain in the Kaira and Ahmedabad districts, Government had arranged for the purchase of four motor boring plants at a cost of Rs 5,000 and for the transfer of other boring plants from the Deccan to Upper Gujarat, and had sanctioned an expenditure of Rs 15,000 to meet the cost of extra staff and material required for that work. It was expected that 30 boring plants would be at work in a short time.

[Bengal]

The Hon'ble Rai Radha Charan Pal Bahadur asked if Government would lay on the table a statement showing the measures taken by the Provincial Malaria Committee in Bengal during the last three years and to what extent those measures had been successful in reducing the savages of malaria?

Government replied as follows —

The Provincial Malaria Committee is an advisory, not an executive, body. For the recommendations made by the Committee the Hon'ble Member is referred to the answer to

a similar question asked by the Hon'ble Babu Surendra Nath Banerji. Particulars of certain anti-malarial works carried out during the last three years with the approval of the Provincial Malaria Committee are given in three statements (A,B and C) appended. During the past year, five Sub-Assistant Surgeons were also employed on quinine distribution in Malda, and an Assistant Surgeon besides Sub-Assistant Surgeons was sent to Manikganj. Quinine has also been distributed to school children in Hooghly. It is impossible to estimate the actual result of this work, but numerous petitions for its continuance show that it was highly appreciated. The work done on the lines recommended by the Provincial Malaria Committee for the popularisation of quinine has shown excellent results, as may be seen by the rapid increase in sales during the last three years. Over 73,000,000 grains have been sold up to 30th November this year as against 15,301,000 sold in 1913—See statement D appended. (The statements are not reproduced.)

Recent Publications.

The Improvement of Towns and Cities, or the Practical Basis of Civic aesthetics. By C M Robinson (Fourth Edition, Revised). Putnam's.

A MANUAL FOR HEALTH OFFICERS. By J Scott Macnutt. Price 12s 6d net.

TUBERCULOSIS. A general account of the disease, its forms, treatment and prevention. By A J Q Blake, M D, F.R.C.P. Price 2s 6d net.

VILLAGE GOVERNMENT IN BRITISH INDIA. By John Matthai, with an introduction by Sidney Webb. Price 4s 6d net.

A STUDENT'S BOOK ON SOILS AND MANURES. By E J Russell, D SC, Cambridge University Press. Price 3s 6d net.



Notes of Cases.

INDEPENDENT CONTRACTOR AND MUNICIPAL LIABILITY FOR NUISANCE — The New York Court of Appeal held, in *Herman vs City of Buffalo* (108 N E 451) that while a municipal corporation is answerable for damages caused by the maintenance of a nuisance on its land by its own servants, it is not liable for such a nuisance created by competent independent contractors or sub-contractors. The Court found that an owner is not liable to third persons for injurious acts of contractors, unless the acts are imposed on the owner, and thus cannot be delegated so as to exempt him from liability, or in case where the thing contracted to be done is necessarily unlawful or the injury is a direct result of the work required of the independent contractor under the terms of his contract or by the orders of the owner.

Practical Points.

[The questions of subscribers only are answerable in the Gazette. The name and address of the subscriber must accompany each communication which must be legibly written.]

1 The water in the mains of a local authority escapes from the mains and causes damage to the property of an adjacent owner. Is the local authority liable?

Ans The local authority is bound to keep its mains in a proper state of repair and if water escapes and causes damage, it is always liable. [See *Charing Cross, &c, Co vs London Hydraulic Power Co*, 78 J P 305]



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[1916

Taluk Boards in Madras.

I N a previous article* we said that the best way of improving the working of the taluk boards would be that which, while giving the fullest emphasis to the popular wishes and popular decision in the matter of spending the money raised by local taxation, would utilise the services of the trained bureaucracy in carrying out those wishes and those decisions. Now if the taluk board is to express the wishes of the people and if its decision is to represent what is the popular will, it is evident that the representatives of the people should be in a large majority in the constitution of the Board. The present Act provides that nominated officials should not exceed one-third of the whole number of members, and that in the absence of orders to the contrary the number of elected people should be two-thirds of the total strength. While the Act is very fair in this respect, the responsible authorities have not apparently found it advisable to give full effect to it. For long the elective system was viewed with alarm and suspicion. When it was decided to give a trial to this system, it was not deemed safe to throw open more than a third of the seats to be filled by the electorate. Subsequently it was decided to raise the proportion to one-half, but such is the weight of orthodox official opinion that, where the total strength of the taluk board was an uneven number, most of the taluk boards preferred to take the nearest whole number less than half as

* See p 798 of Vol I

the elective proportion. Now it is high time that we give a very fair trial to the system which the framers of the legislation contemplated as early as 1884 and take courage to throw open two-thirds of the total number of seats for election. This then is the first reform which we should like to see carried out.

It will not do merely to raise the proportion of elective seats. We have to see whether there should not be precautions to ensure that the persons elected are representatives of the people. This is apparently the aim of the present rules for the election of members which practically restrict the franchise to substantial landholders, with very few exceptions, and require, with the single exception of village headmen, that the candidates should all be non-officials. It is for consideration how far the village headman is a mere revenue official and how far he retains his old proud position of the head and representative of the villagers. But for the present, we may take it that the framework of the election rules is all right, though it is necessary to consider whether the qualifications for voters should not be somewhat lowered so as to enable a larger proportion of the inhabitants to take some part in choosing a representative for them.

But it may be argued that so far the present elective system has not proved a success. The statistics given in the annual general reviews of the Government on the work of these local bodies show that there are very few contested elections, that in the case of contests not even half the total number of registered voters take part in them, that too often no one is coming forward to stand for election, and the Government have to nominate a person for elective vacancies. We have had even cases where absolutely no vote was cast at the poll. It is idle to deny that the man with the statistics is often—and particularly so in this instance—a difficult customer to tackle. And unless the case presented by him can be squarely and fairly met, there is no use in weaving imaginary fabrics to dress the future democratic taluk board in

It is true that when there is a contested election the number of voters who actually go to the poll is not more than 45 per cent of the total number of voters. But is the proportion not sufficiently encouraging? What is the average number attending elections to County Council elections and lesser bodies in the United Kingdom? These local elections cannot in the nature of the case excite as much interest as elections to Parliament or elections to the Legislative Councils here. In view of these circumstances it cannot be said that the figures are really discouraging. Again, many of the cases which do not excite any contest are really not examples of want of interest, but are highly encouraging as showing that when proper candidates stand forth for election the electorate is willing to approve them without any difficulty. We have not any question of party politics here. In many cases, before a candidate stands for election, there is a great deal of canvassing and the prominent persons come to a sort of understanding as to whether any rival candidates should be put forward. The last class of cases—that where no candidate comes forth or no votes are cast and the authorities have to appoint a member for default are the only cases that deserve consideration. And fortunately the number of such cases is rapidly diminishing as the people come more and more to realise their duties and their responsibilities. And in some of these cases the explanation for the apathy of the people lies possibly quite as much in the fact that election to a taluk board does not really mean any enhanced power or usefulness or anything more than an opportunity to get acquainted with the divisional officer and to curry his favour more easily than otherwise. And naturally very few respectable people care to expose themselves to that allegation. Even so, therefore, the remedy is to make the elections more popular and give more power and independence to non-official opinion in the Board. Another reason for the absence of keen contest in the case of these elections is the fact that voters have often to travel from their villages to a distant polling centre where alone they are allowed to record their votes.

There is another factor to be considered in revising the constitution of taluk boards. The present scheme of Local Self-Government has the great disadvantage of being not a growth from the normal needs of the people but imposed from above by the Supreme Government. It may be doubted whether any scheme which owes its origin to an outside power can have any chance of taking root in the customs and affections of the people. It is therefore not to be wondered at if there are responsible schools of politicians who do not believe in the present system at all. To give it a wider chance of usefulness and a fair opportunity of enlisting the sympathies of the rural villagers, it is desirable to consider whether its foundations cannot be widened. A real attempt must be made to make the village the unit of Local Government. At present, it is only the revenue division. Even if the revenue taluk is made the unit, we are not carried very far, while the disadvantages pointed out by the officers of Government are only heightened. It may perhaps seem to be too much of a long jump if all at once every village is made a self-governing unit. The recent Government order on village panchayats is possibly actuated by some such feeling when it laid down a population limit of 3,000 to enable a village to be constituted into a union. In any case, the time is far distant when we can find every little village of 500 inhabitants or so will have the necessary men and means to organise their own affairs for themselves. But while keeping this as the ultimate goal of Local Self-Government, we have still to find some small organisation in which all these petty villages can make their voices heard and their wants considered, and which will form a basis for the activities of the taluk board.

Bearing the above considerations in mind, we venture to offer a suggestion for the enlargement and reconstitution of our taluk boards. We divide villages into four groups. In the first class come those that are incorporated in a municipal council. We shall have nothing to say to them. In the second class come those which are included in a union under

the present Act, and which we may class as major unions, *i e*, unions with a population of not less than 8,000 and which are, so to speak, the training for a municipality. The third class will consist of other unions. Then comes the large class of villages which are purely rural in character and which form the backbone of the country. Now unions formed under the present Act are practically miniature municipalities and we fancy that in the forthcoming legislation they will be given larger independent powers of taxation and be made to approximate even more closely to the municipal model. In any case the major unions are all largely urban in character while still retaining many of the advantages and disadvantages of rural villages. For the sake of cleanness we will call them in the course of this article urban unions—major and minor. Our proposal now is to form the remaining villages into small groups which we may call rural unions, as contrasted with the urban unions and which will be continuous with the revenue inspector's *filka*. In these unions each component village will have its representative. Such representative will be elected by all the villagers in an open meeting to be presided by an official or a prominent non-official who may be nominated for the purpose by the revenue divisional officer. The council of the rural union will thus consist of prominent men selected by the inhabitants. The members of this council as well as the members of the minor urban union within the revenue limits of this group will then proceed to elect a representative from among themselves or from among other prominent residents of the group. This representative will *ipso facto* be the representative of the union in the taluk board and also be the chairman of the rural union. Each urban union also will similarly elect its chairman who will have a seat in the taluk board. Thus the non-official members of the taluk board will consist of chairmen of the several rural and major urban unions within the area of the board. A small proportion may be nominated or co-opted by these to represent minorities. In addition, there will be the tahsildar of the

taluk, the sub-assistant inspector of schools and perhaps a D P W officer of the sub-division to give the necessary official information, experience and advice to the board. The board as thus constituted should have the supreme voice in all its affairs, subject of course to the right of the district board and the Government to intervene in certain cases.

Now in the scheme sketched above, we have not made any mention of the powers and duties of the rural unions. We need not say anything about the urban unions, for their functions are defined in the Act. For the rural unions we would hand over a lump sum of money to them from the funds of the taluk board, which they should spend in maintaining the elementary schools within their range, repairing or improving village roads and improving village sanitation. They should have the power to distribute this lump allotment as best they like among the several villages of their group, and can ask these individual villages to supplement this allotment by a lump sum contribution from the village (to be apportioned according to the customary method, still so widely practised in the case of what are euphemistically known as *Jamabandi* collections,) and spend the total amount in the village concerned on the object specified. The president of the rural union and the president of the taluk board will satisfy themselves that the amount is properly spent and certify to the taluk board that they are so satisfied. There would be no further detailed audit but at any time the chairman or the taluk board president may get any of these works checkmeasured by the regular engineering agency, if that course is considered necessary. The chief duty of the rural unions, other than spending the lump grants thus given or contributed by themselves, will be to voice the needs of their group in an authoritative manner. Such resolutions will naturally come for consideration in the taluk board, which will thus be able to decide which of these claims of the several unions can or ought to be gratified and in what order of urgency. And the taluk board being mainly composed of the representatives of

the several unions can be expected to decide with more or less well-informed impartiality on the requirements of the people, and need not be swayed entirely by the individual wishes of the executive officers, liable as they are to several drawbacks. The rural unions will gradually become the arbitration board to decide between the rival claims of different villages in the fika.

We consider that the constitution outlined above is likely to be more elastic and flexible than the present and it can be regarded as a distinct step in advance. We have still to consider the question of the executive which will have to carry out the decision of the boards. Now in this matter, again, there is no need to press all the different boards into one cast iron mould. In the very nature of things this is impossible. The taluk boards vary enormously in size and importance. Some of them consist of four revenue taluks and are in many respects as important as a small district board. Others are petty small single taluks, compact in area, poor in resources and not moderate in their needs. To meet the various classes of these boards, there should be different kinds of executive. Some of these can, in spite of the inherent difficulties in management by non-official presidents, be still conveniently managed by them. And we will certainly never argue against the continuance of the experiment now so successfully inaugurated in this presidency. With a largely popular board consisting of responsible people, the difficulties of the non-official president ought to be considerably minimised. In other cases, it would be desirable to adopt the experiment, said to be successful in the case of several municipalities in the Bombay Presidency, of appointing a Commissioner, who will in almost every case be the divisional officer. The system would be much the same as at present, except that the divisional officer will be only the executive officer instead of the ruler and guide of the taluk board. In other cases again there should be no alteration in the present system. This variety gives every opportunity to the revenue officials to get

themselves trained in local administration, which from their point of view is highly essential for their usefulness to the public, and at the same time gives opportunities to competent and zealous non-officials to get experience in administration. And, above all things, in all cases there is the chance that the desires and wishes of the people will receive adequate consideration. There are several details in the scheme outlined above which need fuller consideration, but such as it is, it is presented to the public for discussion.

Consistently with the alteration in the constitution of the taluk boards, there should be a change in the composition of the district boards. The president of every taluk board will be an ex-officio member in it. In addition, every taluk board will elect from the inhabitants of its area two or three competent representatives. Then the whole body as thus constituted may elect a certain number to represent minorities. All revenue divisional officers, an executive engineer, the D M S O, the Inspector or Assistant Inspector of Schools should be ex-officio members. The Collector as at present may continue to be the president, though we hope that very soon some district boards at least will have the privilege of being presided over by non-officials. In any case the *majority* of members in the district board should be *elected*.

The Drainage of Cities.

[BY J. W. MADELEY, M.A., M. INST. C.E., M. AM. SOC. C.E.,
SPECIAL ENGINEER, CORPORATION OF MADRAS.]

(*Concluded from the last issue*)

14 The importance of house drainage cannot be exaggerated. It is in the houses of a city that the population spends by far the most of its time, and proper house drainage is, therefore, of the greatest importance from a health point of view.

The importance of executing house drainage on proper lines is so great that most Municipalities have a set of drainage

by-laws to ensure, as far as possible, that the design and workmanship shall be of first-class quality

The object of house drainage should always be kept in mind. It is the collection of sewage and its conveyance to the sewer as rapidly as possible.

In dealing with house drainage and its connection to sewers, it is convenient to divide the subject into two sections

(1) House drainage proper by which the domestic sewage is collected and delivered to the side of the street

(2) House connections by which the sewage is conveyed from the side of the street to the Municipal drain. These two divisions will be considered separately

Classes of house drainage

15 House drainage in Indian cities may be divided into three classes —

(1) FIRST-CLASS on the water carriage system for those houses and buildings that are furnished with water-closets, baths, lavatories and sinks drained on European lines

(2) SECOND-CLASS drainage, retaining the open house drain so largely used. This system is used for the ordinary small houses of Madras in which it would be most unwise to introduce underground drainage

(3) The drainage of parachelies and collections of huts where each habitation cannot be provided with a separate connection to the sewers. In such cases a suitable number of latines are provided

16 The second and third of these three classes should be regarded as temporary and everything should be done to encourage first-class drainage which has the following advantages —

Advantages of first class drainage

(1) Excreta and urine are rapidly removed without causing any nuisance

(2) Filthy hand scavenging which requires many men, women and children is abolished

(3) The cost and nuisance of conservancy of night soil, and the cost of night soil depots, and trenching grounds are done away with

In cities where there is no underground drainage, first-class drainage can, however, be introduced only gradually because of the expense and the necessity of first educating the mass of the inhabitants to work the system properly. With improper use, the system would give great trouble. There is no doubt, however, that if this system is installed by hospitals, hotels, clubs and more gradually by private persons, as is now being done in Madras, the great cleanliness will be much appreciated, and a general demand will arise in all Indian towns for the first-class type of drainage.

17 House drainage work may be divided into three classes according to the nature of the material which has to be removed, namely,

Classes of house
drainage work

(1) "Soil" drains and pipes for the conveyance of excremental matter

(2) "Waste" pipes, etc., for waste and dirtied water from sinks, baths, lavatory basins, etc

(3) "Rainwater" pipes to carry rain water

They are objectionable and dangerous in the order given above, and it is usually considered that waste pipes require less stringent treatment than soil pipes and drains. Rain-water is, of course, purer and, in a separate system, such as that adopted in Madras and in most Indian cities, it is as far as possible kept out of the soil drains altogether.

In first-class house drainage, closed water-tight and air-tight pipes alone are used, the only exception being that rain-water pipes need not be absolutely air-tight. It is of vital importance that gases generated in the sewer drain, soil pipe

and waste pipe should be absolutely excluded from the interior of the house

18 To ensure this, the upper ends of branch pipes are invariably protected by means of a "trap" which provides a water seal and prevents gas entering the house, unless it be under sufficient pressure to force the trap

Traps.

A trap usually consists of a vertical bend, forming a low place in the pipe in which water lodges, so that no gas can pass from the outlet of the trap to the inlet, unless the water is pushed back with sufficient pressure to force open a free passage. It is also usual to disconnect the sewer from the house drain by means of such a trap which is then called an *intercepting* or *disconnecting trap*. Disconnecting traps are practically universal in most English towns, but a large section of sanitarians are coming to doubt the advisability of fixing them as a general rule, and in Madras they are fixed only when the Engineer considers them advisable.

Wherever a trap is used, it should be of a form which will allow both liquid and solid matters in the sewage to pass freely through it.

19 It is of great importance that the whole of the house drainage system should be well ventilated. To ensure this, it is usual to require that an untrapped opening is to be provided at the head of every drain and branch drain, and at such other points as may be required, the Engineer being the judge in each case.

Ventilation of house drains

20 (1) All drains should run in straight lines both in plan and elevation, where the direction of a drain has to be changed, a manhole should be provided.

General principles to be borne in mind when laying out a house drainage system

(2) All pipes carrying soil and waste water should be outside the house where practicable. The advantage of having

pipes outside is that any defects are readily seen and also any defect leading to leakage or escape of drain air is not so serious a matter as it would be inside the house

(3) *Size of drain* Every drain should be of adequate size and never less than 4-inches in internal diameter nor should it be more than 4-inches unless considered necessary by the Engineer

(4) *Gradients* The standard gradient should be 1 in 40 for 4-inch drains and 1 in 60 for 6-inch drains

(5) *Drains to be straight* The drain shall be laid in straight lines and regular gradients with fewest bends practicable and every change of direction shall be formed by properly curved pipes or channels

21 For many years to come, first-class house drainage will be unpracticable in the bulk of the houses of most Indian towns for the following reasons —

First class house
drainage impracticable
at present

(1) The expense of installing underground drainage throughout the poorer class houses would be prohibitive

(2) Owing to the way in which the majority of houses are built together drainage to the back is impossible. A covered pipe would, therefore, have to be laid from the front to back under the house. This would be difficult and dangerous because of the likelihood of damage to the walls by digging trenches close to, and in many cases, under, the house walls

(3) Flushing would be absolutely necessary and would entail water service and flushing cisterns

(4) It is likely that, if underground drainage were introduced into poorer houses wholesale, it would be a failure, until the people have been educated out of some of their habits, such as throwing leaf plates, rags, etc., into the drains

22 The separation of rainwater from sullage in a second-class house drainage is best effected by small brick or concrete curbs which divide the court-yards into washing places and rain-water areas. Rain from the roofs drops off the eaves, and falling on the court-yard, is caused to flow into a "U" shaped storm-water drain from which it is conveyed to the street side drain. The sullage water from washing places and from cookhouses is directed by the curbs into a separate sullage drain.

23 Although underground pipe drains from end to end of the closely built-up houses are not recommended for the reasons given, yet where there is underground drainage, it should be insisted that the dry latines found in most Indian cities should be replaced by flush-out latines situated next to the road, so that a short length of cast iron pipe can be used to take the sewage direct to the sewer connection (without passing through the silt catcher or sullage water siphon).

24 For a long time to come, there will exist in all cities of the Madras Presidency, paracherries and collections of huts where each separate dwelling cannot be provided with a connection to a sewer. In such cases, the most practical method is that adopted by the Madras Corporation in the construction of Model Paracherries, to have a sufficient number of suitable latines for the use of the inhabitants of paracherries, and to provide the houses with a good class of side drain for the removal of sullage water. These side drains should be protected by constructing a low curb on the road side a little higher than the road level. This will prevent stones and sand being washed into them and will obviate a great deal of the labour which is at present expended in cleaning road metal out of drains after heavy rains.

25 House drainage works collect the sewage which is delivered to the sewers through the house connections. The sewers remove excreta and liquid wastes from the region of habitation, and prevent them from contaminating the earth, air and water. The combined filth is delivered at some point outside the city, and has to be disposed of so that it shall not create offensive or dangerous conditions. This is the problem of sewage disposal.

Different methods of sewage disposal

26 The methods of sewage disposal may be classified as —

- (1) Dilution
- (2) Chemical Precipitation
- (3) Bacterial Purification
- (4) Disinfection
- (5) Land Treatment

In all these processes, there is usually the preliminary removal of solids by screening and sedimentation, and in all, except disposal by dilution, there is the problem of sludge disposal.

27 In the method of disposal by dilution, the sewage is discharged into a much larger volume of water, e.g., a large river or the sea and is rendered innocuous —

Dilution

- (a) by dilution
- (b) by oxidation and the destruction of bacteria

The British Royal Commission on Sewage Disposal has fixed as a general standard that the suspended matter must not exceed 3 parts in a hundred thousand and that the oxygen absorbed at 65° Fah must not exceed 2 parts in a hundred thousand in five days. They also allow special standards where the dilution is considerable as follows —

If the dilution is between 1 in 150 and 1 in 800, no oxygen test is required, and the suspended matter may be

allowed up to 6 parts in a hundred thousand. This result would probably be obtained by the Chemical Precipitation method of treatment.

Where the dilution is between 1 in 300 and 1 in 500, the suspended matter may be allowed up to 15 parts in a hundred thousand. In this case, probably tank treatment without chemicals will be sufficient.

Where the dilution exceeds 1 in 500, no tests are required, but the sewage should be passed through silt pits and perfectly screened before being turned into the stream.

Cities situated by the side of the sea are fortunate in having a large volume of water into which sewage may be poured, but great care must be taken in selecting the outfall, in order that the sewage may not be a nuisance.

In Madras, we recently had the well-known "Kelly's Scent Bottle" where a very real nuisance and danger to health was created through the sewage being discharged into the sea in such a manner, and in such a place, that it remained close to the foreshore, and by its putrefaction caused an abominable stench which was specially noticeable after sunset.

If large streams or the sea into which sewage can be discharged, are not available, it is usually necessary to adopt some special method of treatment.

28. In the Chemical Precipitation method, lime combined with alumina-ferrie is commonly used, the object being to produce a flocculent precipitate which, when the sewage is allowed to stand, settles to the bottom carrying with it the suspended matters. Chemical Precipitation is of special use for sewage containing a certain amount of trade wastes.

29. At the present time, bacteriological processes are used more than any others. The object of bacteriological processes may be briefly stated to be the removal of sludge, and the breeding of suitable

species of bacteria which will convert a putrescible sewage into a stable liquid

Septic tanks form an important bacteriological process for preliminary treatment of sewage. The main result obtained by this type of tank is the removal of suspended organic matters, largely by the solution and precipitation of the organic solids. A reduction of about 60 per cent in the suspended solids may be taken as the average.

After treatment in septic tanks, the sewage may be passed to tanks filled with stone or other suitable media for the cultivation of bacteria. These beds may be alternately filled with sewage and allowed to stand empty, in which case they are known as "contact beds," or the sewage may be supplied continuously to the tanks in the form of a spray when they are known as "trickling beds." A considerable amount of purification is effected in these beds and a non-putrescible effluent is generally obtained, but it often contains a certain amount of suspended matter. For this reason, the effluent should be passed through another set of tanks known as "humus" tanks. After this final treatment the liquid is usually sufficiently pure to be discharged into even small streams. If land is available, it is preferable to pass it over the land.

30 In a climate like that of Southern India where there are long periods without any rain, and
 Land Treatment sewage is therefore of great value as water as well as for manual purposes, land treatment is usually the best to adopt. In this method of treatment, the sewage should generally receive preliminary treatment by being passed through silt pits, screens and septic tanks to reduce the suspended matter. It may then be used to irrigate land and is very suitable for crops, such as harra grass, sugarcane, coconuts and others. Except in a very porous soil, it is usually necessary to under-drain the whole of the irrigated land and sufficient area should be acquired to allow one-fourth

of the whole being dug up, otherwise it will become "sewage sick," and unsuitable for cultivation

The Madras City sewage is treated on a farm which is one of the most successful in the world. Owing to the climatic conditions, and the nature of the subsoil and of the sewage, it is possible to pass the sewage straight on to land which has not been under-drained, and the rate at which the sewage is applied is 50,000 gallons per acre per day—an exceedingly high rate and very seldom approached in other countries except with sewage that has received through preliminary bacteriological treatment

Ideals of Local Self-Government: Town Planning, and Architecture in Ancient and Modern India.

[BY K S RAMASWAMI SASTRI, B A , B L]

I

EVER since Professor Geddes came to India and turned our attention to town-planning and house building as matters upon which national well-being and the soul's true welfare and joy depend, a new and keen interest in the subjects has sprung up in our land. "The battle of styles" that we heard of some time ago in regard to town-planning and house-building at Delhi would not have been heard of some decades ago. The last generation and the generation previous to it of educated Indians had made a surrender of their individuality and then soul to western ideals of life and art to such an extent that they did not know that town-planning and house-building were arts that had been carried to a high state of perfection in ancient and mediæval India and that no sacrifice would be too great to preserve one of the dearest achievements and possessions of the Indian genius. Happily for us now, the efforts and writings of Mr. E. B. Havell and Dr. A. K. Coomaraswami, the lectures of Professor Geddes, the new-born national spirit that realises what a great civilisation was built up by our famous forefathers and knows that a

great future can spring only through a vital connection with the present and the past, and the efforts of scholars in India and abroad to throw open to all persons the gates of ancient learning have brought about a better state of things, led us into right relations with the past, made us realise the greatness of the arts of town-planning and house-building in ancient and mediæval India, and enabled us to have self-consciousness, self-knowledge, self-reverence, self-control, and self-sacrifice, without which it will be impossible to attain the loftiest heights of national achievement

The subject is one in which a great deal of pioneer work has yet to be done. We are yet in the stage of accumulation of materials and tentative formulation of theories. The deep spirituality of the Indian mind which at the same time had a profound imagination has made it in its royal progress through the ages adown the road of time seek the companionship of religion and art. Even now art and religion are close and beloved companions in India and are full of vitality and loveliness. Hence we are able to study the arts of town-planning and house-building not in the museum of dead books recording a dead past but in the "living present, heart within and God overhead."

I shall first deal with the chapters on the subject in the various *Niti Sastras*. I shall then deal with the information derivable from the *Mana Sara Silpa Sastra* which has been dealt with *in extenso* in Mr. E. B. Havell's latest book called *The Ancient and Mediæval Architecture of India. A Study of Indo-Aryan Civilisation*. I shall then try to bring into focus the scattered ideas on the subject contained in Indian literature. I shall then briefly advert to the ideals and methods of these great Indian arts and to the evolution of the arts in India till recent times. I shall finally refer to the present state of the arts in their state of unfortunate and undeserved neglect and decay, and make a few suggestions to enable us to give them the honour which is their due by

virtue of their beauty and their long record of loving service to Indian humanity and to God and to re-seat them on their ancient seat of glory and reverence in our hearts

Even at the present day there are master-builders in whose families are handed down from generation to generation as a priceless inheritance the arts of temple-building and image-making in a state of perfection of loveliness as yet unrealised by the learned students of Indian arts in our land or abroad. Mr. Havell has adverted to this fact in his recent review of Mr. Gangooly's *South Indian Bronzes*. Such master-builders are called *sthapathis*. I can bear testimony personally to the genius displayed by them in the building of temples and making of images in various places in the Tamil districts of this Presidency. Mr. Havell speaks thus of the master-builders of Northern India

"Two years ago I made another offering at the shrine of truth by calling public attention to the work of the living Indian master-builder, whose existence is ignored by the 'Imperial Gazetteer'. Departmentalism became seriously alarmed. He was not on the file—the District Officer had not seen him. He must be extinct, for Sir Lepel Griffin, K.C.S.I., when agent to the Governor-General for Central India, had written that 'the love for and practice of noble and beautiful architecture seems to have died out of India previous to the advent of the English'. Official experts said he was a figment of my imagination. And so he remained officially, until last year the report of special investigations into the conditions of modern Indian architecture, undertaken at my suggestion before the question of the building of the new Delhi came into the arena, was published. The inquiry, though admittedly only a very superficial one, had proved that, so far from exaggerating the facts, I had understated the capacity of the modern Indian master-builder, for besides a quantity of fine building work in many different parts of the North of India, the report revealed the fact that, under favour-

able conditions, Indian master-builders can build as well as, and better than, their forefathers did in the days of Shah Jahan. For in the very district which was Sir Lepel Griffin's field of observation, a mosque larger than the famous Jamī Masjid of Delhi, and, so far as it is completed, a finer work of art, is now in progress, designed and carried out entirely by Indian craftsmen. Departmentalism, *more suo*, of course will belittle the importance of the revelation, as it did in the case of the hand-weaving industry, but the living Indian master-builder is now on the official file, though only as a 'controversial subject'—for departmentalism is still incompetent to weigh artistic evidence, however convincing it may be to those who are able to do so. Just as an Act of Parliament, however bad it may be, is law to all good citizens until it is amended or repealed, so the Indian Public Works system of building, based only upon inefficiency, ruinous to Indian craftsmanship and otherwise economically vicious—equally bad in art and science—will be defended by officials, as good officials, until the order is given to revise it. By the irony of fate, it seems quite probable that the *deus ex machina* who will secure this long-deferred reform for India will be the English craftsman who is now in revolt against a system which, as Ruskin said, makes the most pitiful form of slave—a mere machine with its valves smoothed with heart's blood instead of oil, when he might be a living progressive, and happy human being."

I have quoted this long passage here to show how before our very eyes blind-folded by wrong notions and false theories, the great arts of town-planning and architecture still flourish in our land, how we still possess though in rare cases the secret of the magical touch by which the spirit of beauty shines out incarnate out of the materials lying about our very feet. I wish to say here only two important things. First, an ever-increasing number of people should take an intelligent and loving interest in Indian arts—especially in the arts of town-planning and architecture—because men must live in well-planned cities with well-built buildings before they can

achieve greatness in the various other departments of human activity. Dr. A. K. Coomaraswami well says in his book on *Art and Swadesi*

“Even to-day it is far easier to lecture to an ordinary European audience on Indian art, and find some understanding of it, than it is to secure this understanding from an Indian audience. In all other civilized countries while the general public remains indifferent to good art, there are small groups of persons who can feel the passion of, and care for, any good art. In India, not only is the good part of Indian art quite ignored, but ‘educated’ men are capable of understanding only the commonest academic art of Europe, and care nothing for the real masters of painting and sculpture. What a commentary on the worthlessness of a century of so-called ‘English education’ ”

If we do not learn and love the great Indian arts, they will die out soon. Our arts can survive opposition and rivalry but cannot survive neglect and indifference. The passing away of native courts of the older type has struck the first blow at them, and the general decline of religious feeling and artistic knowledge due to a radically defective and imperfect system of education is now striking a still deadlier blow. Such widespread and keen knowledge and love of Indian arts is especially necessary in the case of the arts of town-planning and architecture, not only for the reason stated already but also because in India all arts form a great family group, the mother-art being architecture. As Dr. A. K. Coomaraswami well points out

“All the arts were harmonised in one great unity, based, as all art must be, on architecture. The modern method of painting pictures and sticking them indiscriminately on nails about the walls of houses comes as near perhaps to the absolute divorce of art from architecture as is possible, but it is not a sign of taste on which to congratulate the moderns. The old Indians knew better, that walls were to be painted on, and

that the heart and centre of the temple was its image, and neither painting nor image were executed apart from any consideration of the place they were to occupy "

The other idea that I would like to emphasise here is the need for showing regard for tradition. Everywhere tradition is, as well described by Sister Nivedita, "the jewel casket of humanity." In times when knowledge had to be committed to the custody of the many to prevent its being overwhelmed by oblivion and had to be made simple while accurate to save it from fluctuations of memory and to be connected with religion to ensure its deathlessness by a sense of its sacredness, our forefathers summed up their experience and knowledge in the form of tradition. The importance of tradition as a summation of experience is greater in India than elsewhere, because our conservatism, our tenacious adherence to our ideals, and the living and vital connection of knowledge and religion through the ages have secured for tradition a fulness and a continuity not to be found elsewhere in the world. Scholarship at all times—and especially in modern times in India—will be losing its chart in voyaging over the sea of speculation if it throws tradition overboard. There is no objection whatever to putting tradition on its trial and rejecting it if the accumulated evidence and the rigorous application of the laws of logic compel us to do so. But in legal language the onus of proof must be on those who seek to do so. The further difficulty now confronting us is that, owing to the defects of the modern system of education and modern standards of life, tradition itself is in danger of breach of continuity and eventual disappearance. I cannot conclude these preliminary observations better than by quoting the following passage from Dr. Coomaraswami's *Art and Swadesi*

"The true function of Schools of Art in India is not to introduce European methods and ideals but to *gather up and revitalise the broken threads of Indian tradition*, to build up the idea of Indian art as an integral part of the national culture, and to relate the work of Indian craftsmen to the life and

thought of the Indian people . . . But who can do this work ? Not many Englishmen possess the necessary patience, or the necessary will, like all true education in India, this work must be done by Indians. It is a question of national education. This question, touching as it does the vital base of the whole of Indian life, is of more importance than any political or economic reform. Rather than the achievement of any measure of progress in those directions, I would see Indians united in a demand for the complete and entire control of Indian education in all its branches, and determined that that education shall produce Indian men and women—not mere clerks, or makers of petty curiosities for passing tourists. It rests with the Indian people themselves to say what the answer shall be.”

The Inside and Outside of an Indian Home.*

[BY RAO SAHEB U RAMA RAO, MEDICAL PRACTITIONER.]

I

If in the centres called home, the foundations of the science of health are laid, the rest of the town, on a large scale, will necessarily follow, for the same rules that apply to the accumulation of wealth apply equally to the accumulation of health. “Take care of the pennies,” says the financier, “the pounds will take care of themselves.” “Take care of the houses,” says the sanitarian, “the towns will take care of themselves.” So every sanitary improvement must commence from the house. Man in building houses for his protection from the external elements, not knowing how best to build them to suit the sanitary requirements, has brought on himself a series of fatal diseases.

The most fatally spreading diseases which man has introduced into his house are small-pox, measles, consumption, chicken-pox, relapsing fever, etc. The poison of small-pox

* From a paper being the third of the Popular Health Lectures, delivered at Madras.

and other eruptive fevers, may be retained in a dwelling for a long period. It may be concealed by adhesive materials, on the wall, in the ceilings, or on the floor. Even when the poison gets dried up and converted into dust, it retains the poisonous properties and it could be transmitted from one place to another without losing any of its specific power.

Principles of Home Sanitation

1 The house must present no facilities for holding dust or poisonous particles of diseases, *e g*, porous and absorbing materials such as, thatch or straw for roofing, unplastered walls and ceilings, uncemented mud floor, etc, and in furnishing a house all materials that catch dust, keep dust, hide dust and on being shaken, yield clouds of dust, are to be avoided.

2 The house must possess every facility for the removal of its impurities, as fast as they are produced, *e g*, dust, refuse, remnants of food or sewage, which must not be allowed to accumulate in the house.

3 The house must be free from damp. All the materials used for building a house should be dry and impermeable to wet. The wood should be sound and well seasoned. The brick or stones used should be free from the power of absorbing and retaining water. The plaster in the walls should be impermeable.

4 The house must admit a free supply of fresh air and sun-light, for, light and life, darkness and death, go together. There ought to be no dark and ill ventilated rooms in the human habitation, for sun-light and fresh air not only make all clear, but also purify the air by killing the germs of disease, keep away noxious insects and also make the blood rich in oxygen, thereby making the individual healthy and strong to fight any disease. If too many people live together, and especially if they sleep in one room, it helps disease, makes people feeble and weak, even if they escape actual disease, it kills children and those who are not robust, because they are

always breathing bad air, fouled by carbonic acid gas and other poisonous matter which their bodies and those of other inhabitants have thrown off

5 The house must be supplied with a sufficient supply of pure and perfectly filtered water, as impure water is the cause of the most fatal diseases which attack man, *e g*, cholera, enteric-fever, dysentery, etc

The house possessing the above advantages may be said to be a perfect and healthy house. It is in such houses that diseases will never be generated, even if they are introduced, they will remain only for a short time

The house site may be at fault, from a moist soil excess of water and organic emanations may pass into the house, or ventilation may be imperfect and exhalations from people crowded together may accumulate, or the excretions may be allowed to remain in or near the house, or general uncleanness from scarcity of water may cause a persistent contamination of the air. In other words, perfect purity and cleanliness of the air, are the objects to be attained in constructing healthy habitations. It is the overcrowding in houses that influence so adversely the health of the community, especially the health of children who suffer most from bad air, damp, dust and want of cleanliness

Now let us examine whether our Indian houses fulfil the above sanitary requirements and if they do not, let us find out the defects and try to suggest remedies to suit the Indian climate and the habits and customs of the people

Indian houses for the purpose of detailed study from the sanitary point of view, may be divided into three groups

- (a) Houses in bungalow areas or garden houses
- (b) Houses on both sides of the street
- (c) Houses on hutting grounds

Houses in bungalow areas or garden houses

These are pretty good sanitary dwellings, built with due sanitary precautions. Still some of them have certain defects which are easily remediable.

The following are some of the defects —

1 In some bungalows, big trees, dense shrubs and creepers are allowed to grow very near the house and so prevent free circulation of air, shut out sun-shine, harbour mosquitoes and also make the house damp by the rain dripping from them. Therefore big trees must be planted away from the house but small crotons or flower-plants in pots, which are less than 3 feet in height may be allowed to grow all about the compound.

2 In some, there are no properly constructed drains to carry refuse water from the bath and the kitchen rooms, stable and cow-houses, to different parts of the compound for gardening purposes. In consequence, water stagnates in earth ditches and gradually soaks into the ground making the compound damp, fouling the subsoil water—often the water of the well near by from which people draw water for drinking purposes. So, there ought to be well constructed cemented drains, to distribute water for gardening purposes.

3 In some, there are small unused tanks, ponds and wells, which breed mosquitoes and thereby encourage the prevalence of malarial fever in the house. To avoid this, such ponds and wells must either be closed by filling them up with good dry earth or sand or by covering them with mosquito-proof wire gauze or by covering the water surface with a layer of kerosene oil, once in 4 days to prevent the breeding of mosquitoes (a teaspoonful to 1 sq yd).

4 In most houses there are no verandahs round the house. Verandahs keep off sun and rain and prevent the walls from getting hot. Such walls radiate the heat to the

air within and make the room warm. So, garden houses in hot climates must have verandahs at least 6 feet wide all round the house.

5 In others, people allow house and kitchen refuse, sweepings, decomposing stable litter, cow dung, etc., to decay near the house and to emit a bad odour which fouls the air, whilst the refuse itself harbours house flies.

Houses on both sides of the streets

The majority of the houses in Madras are built on both sides of the streets in crowded localities. Generally well-to-do Indians are not very partial to living outside the crowded areas though they can afford to live in garden houses. In fact, there is a large section of Indian Bankers or rich money-lenders in George Town, who, though they own fine bungalows, yet live in crowded localities.

In cities like Madras, sites for building purposes are fixed and there is no choice for the builder. Still it is better to understand what to avoid in making a selection. For building a house, a dry site ought to be chosen, the site should be sufficiently raised above the level of some natural water course whenever possible to afford an adequate outfall of its surface drainage. Clayey soils which are apt to hold water ought to be avoided, unless well drained. If houses have to be built on clayey soil, fill in with sand to a depth of at least 3 feet below the foundation to drain away moisture and cover with concrete to a thickness of at least 6 inches over it and raise the ground floor of the house at least 3 feet above the surrounding level. If you do not do so, the house will be damp and the air will get fouled and you will suffer from *Rheumatism, Cold, Ague, Headache, and Consumption, etc.* Made-up-soil, (i.e. parts of a town from which sub-soil has been removed and which has been used as a dumping ground for rubbish of all kinds till the level is raised to a sufficient height to allow of its being utilised as building sites) should not be used as a building site, unless the area is covered with

a layer of concrete or other impermeable layer of at least 6 inches in thickness. This will prevent damp and ground air coming up into the house. If the ground floor is not made impervious by using either hard beaten mud or concrete and over it cement plastering or well burnt glazed bricks pointed with cement, the ground air which is always foul will be forced up out of the soil and cause illness to the inmates. So, the ground floor of the house, if it is made of mud, should not be allowed to crack. If of brick, the bricks forming the floor, ought to be well pointed with cement, otherwise foul ground air or sewer gas from bad drains underneath the house might escape into the house. Cracks and crevices in floors are to be avoided as these harbour dirt of all kinds and cannot be swept and cleaned properly. The most suitable materials for flooring are marble, tiles, glazed and burnt bricks, and well polished Cuddapah slabs. Every house ought to be built on a basement at least 2 feet above the surface of the surrounding soil.

The house, wherever possible, should face the direction of the prevailing wind so as to ensure a good current of air right through the house.

There should be no irregular depressions close by the house, which during the rainy season are always full of water and form ideal breeding places for mosquitoes, besides often serving as depositories for refuse.

The structure of the wall should be made up of well-burnt bricks. Though sun-burnt bricks are stronger, and resist heat better than burnt bricks, sun-burnt bricks should not be used as they are a favourable haunt of white ants which tunnel them in all directions.

In Madras the walls of houses are plastered with a coarse quality first and then covered with a thin layer of a finer kind over it. This is the best method of plastering the walls as they can be washed with soap and water or with some antiseptic solution whenever they become dirty. But only

when the walls are plastered coarsely do they require white-washing twice a year at least, both inside and outside. On no account should people live in a room whose walls are not plastered as they harbour germs of disease in their crevices and they cannot be easily cleaned.

The roofing materials generally employed are thatch, tiles, terrace constructions and corrugated iron.

Thatch makes a most comfortable roof. It no doubt protects the interior of the house from extremes of warmth and cold but being entirely vegetable in its nature, it is subject to rapid decomposition which is encouraged by alternations of drenching rain and scorching sun, and further it is of a most inflammable nature and also harbours insects, rats, snakes, birds, vermin, etc. On account of these considerations thatch as a roof is very unhealthy and undesirable.

Small, old-fashioned country-made tiles present a few advantages over thatch, but Mangalore tiles or tiles of any other European pattern laid on a properly graded frame work are the best, provided they are supplemented with substantial ceiling, otherwise they will let in too much of heat.

Terrace roofing is by far the best for a hot place. It forms an excellent protection against sun and rain and the smooth finish of both its upper and lower surfaces offers absolutely no hiding place for insects. Besides, the terrace forms an excellent elevated platform to sleep on during hot weather. Its one disadvantage is that it is inferior to thatch as a non-conductor.

Another form of terrace roofing consists of considerable thickness of beaten clay spread on mats or dried leaves supported on a system of beams and battens. Though such roofings are cool, they are to be condemned as they harbour vermin and other insects and are leaky during rainy season.

Zinc and corrugated iron are not suited for a hot place like Madras for dwelling houses, as they are extremely hot in summer and cold in winter.

Houses on hutting grounds

These are insanitary dwelling places. They are generally situated in most insanitary localities. A large section of labouring classes reside in such huts. The surrounding of such huts are low and damp. The streets that run between those huts are not metalled and there are no side drains worth the name to carry off the sewage. The drains are nothing but earth ditches which contain semi stagnant sewage, emitting poisonous sewer gas fouling the air and which if inhaled lowers the vitality and brings on illness. We can see clouds of flies rising off the putrifying sewage which in some cases may be seen to soak into the walls of the mud and palmyra leaf-huts up to a height of 2 or 3 feet above the ground. People are living in these huts with sewage soaked walls, doors, and windows. Sewage, as you know in Madras, contains washings, urine, faecal or vomitted matter from persons probably suffering from typhoid, consumption, cholera and many other diseases, cows' urine, cow dung, food refuse, etc. House-flies, carriers of diseases, settle on sewage or on the wet sides of the side drains and fly direct from these to alight on passers-by, on the eyes of children and on the foodstuffs exposed for sale in the bazaars, thus infecting them with the germs of every conceivable disease.

As for the interior of these huts, the floor is made up of beaten mud, the walls are of coarse mud perfectly innocent of plaster and the roof is of thatch or palmyra and cocoanut leaves. No means of ventilation is provided in these huts and they do not protect the inmates even from the sun and rain. In a word, there is nothing to be said in their favour. Such huts whose dimensions do not exceed 5 x 3 x 4 feet are occupied by more than 4 or 5 inmates.

The health of the occupants of these huts can be better imagined than described. I only wonder why the death rate in Madras, is not higher than it is at present. As to remedying these defects, the only possible suggestion is to pull

down all such houses on all hutting grounds wherever found and build model dwelling houses for labouring classes

Before I conclude, I must draw attention to the fact that the house and its surroundings must be kept perfectly clean. The house may have been built with the best materials, constructed on the most up-to-date hygienic principles, perfectly drained, thoroughly ventilated and supplied with every appliance for health and comfort, yet it will not be fit for human habitation unless it is well cleaned and kept clean always. Dirt is the parent of disease and the enemy of health. The floor of the house should be swept twice a day morning and evening. All furniture in the rooms and halls must be thoroughly dusted every day as dust is a great source of impurity, containing bits of charcoal, cotton and other fabrics, skin, insects, hay, dried sputum, dried bits of excrement and germs of disease, etc. While dusting, some people flap the duster against the furniture. Such dusting is useless. The best way is to take a clean duster in your hand and wipe every part of the furniture retaining the dust in the duster and shake your duster in the backyard (not inside the room) from time to time during the dusting.

Carpets and rattan mattresses for floor are to be condemned as both these preserve dust and dirt. When a number of people are coming and going, dirty matter will get deposited from the feet of the people.

Surroundings of houses must be kept clean, dry and well ventilated. To ensure this, streets should be straight, regular, broad and well paved and well-drained. If the streets are narrow, crowded, crooked and blind, neither the houses nor the streets can be well drained, cleaned, ventilated or lighted. It must be admitted that a large portion of the insanitary conditions prevailing in and outside most dwelling houses, especially of the poor and middle class of people in Madras, is due to the habits of the people themselves, their prejudices, their ignorance of elementary knowledge of sanitation associ-

ated with great poverty. This is a most difficult problem for solution. I am of opinion that educating the mass in sanitation is the only way to overcome these prejudices. Without educating the people about the sanitary defects, any amount of money spent on improving the sanitation is a sheer waste. Without the co-operation of the people, sanitary perfection can never be attained.

The Madras Corporation.

A few Suggestions for its re-constitution

[BY C. P. RAMASWAMI AIYAR, B.A., B.L., MUNICIPAL
COMMISSIONER, CORPORATION OF MADRAS.]

NOW that we are in sight of a revision of the Madras City Municipal Act and are promised a fairly comprehensive codification of Municipal Law on new and liberal lines, it may be as well to consider a few matters which, by the light of experience gained in the actual working of the Corporation, seem to require attention. In the first place, it is fairly obvious that, in order to secure adequately the successful working of Municipal Institutions, a spirit must be promoted of co-operation between the rate-payers and the other residents of a locality and the Municipal Executive. At present, with a few exceptions, the Commissioner elected or nominated is a kind of intermediary between the Executive and the inhabitants with no particular functions except that of raising his voice in the course of a few debates in the Corporation. I do not forget that in many cases a zealous Commissioner is able, by means of periodical inspection of his ward, to remedy grievances and to bring about needed reforms with the friendly co-operation of the Municipal Officers, but the rate-payer too often thinks that he has no function to perform except to grumble and the more ignorant amongst them imagine that the Commissioner for the ward is a kind of non-official agent for the more efficient and rapacious collection of taxes. In order to eradicate this impression and further to

associate the men who pay the taxes with the men who spend them, the only feasible means is to sub-divide each ward into a number of smaller ones and constitute a number of Advisory Committees for each such ward. Perhaps, it might be possible in certain localities to pick out two or three residents of each big street and make of them an Advisory Committee in regard to matters affecting the sanitation and cleansing of that street. Two objections may be urged to this course: first, that the work of the Executive would be hampered by ignorant and purposeless criticism and undue interference, and secondly, that there would be no guarantee that these Committees would do continuous work. So far as the second objection is concerned, I am confident that if the Committees learn that their co-operation is welcomed and their help is availed of, there would be a sufficient number of men to undertake the work and this task would be a good training for work as a Commissioner. In regard to the first objection it must be noticed that even now the various ward Commissioners and the Head of the Municipal Executive are flooded with petitions from persons in each locality, many of them making requests irreconcilable with each other. Each man only thinks of his own house and does not worry about what happens to the street. This is because they have not been encouraged or taught to work together. Further, if these Committees are to make diligent local enquiries, and, in fact, to act as a spur on Municipal diligence and if it is, moreover, understood that their function is solely to bring to the notice of the Commissioner and the Executive the grievances of the particular locality, and the needed reforms, there ought to be no apprehension that they would interfere with the actual working of the machine. Unless such bodies are constituted either under the statute or by means of bye-laws, men would not be ready to take up such work because they are apt to feel that they may be regarded as mere busy-bodies. This is the reason why many Ratepayers' Associations are not able to do continuous work. There is another advantage to be gained by such Committees, namely, that only real and substantial grievances will be put forward for

consideration and not trivial or minor matters. Moreover, there will gradually but surely spring up a feeling of co-operation with the subordinate Municipal staff who are now only too often ignored when they are not attempted to be won over. I attach great importance to this feature, because it must be recognised that no Commissioner of a ward in a big town like Madras will be able, adequately, to keep in touch with the varying needs of each portion of his constituency. I would, therefore, advocate the constitution of a number of Ward Committees as advisory bodies whose duty it will be to bring to the notice of the Commissioner of each ward the defects in the carrying out of Municipal work therein and the suggestion of reforms.

Coming now to the election of Municipal Commissioners, a great deal has to be done in Madras in the way of reform and re-adjustment of the principles on which the sub-division of districts is made and Commissioners elected in respect thereof. In the first place, as matters at present stand, certain very sparsely populated localities have a Commissioner to represent them, whereas a locality which has, perhaps, the population of a small town, is classed as a division. The whole of Madras has to be divided into electoral areas on the principle of the density of population and the importance of the locality from the commercial or industrial point of view rather than of certain arbitrarily fixed boundaries. I would, moreover, increase the number of electoral wards so as to make many of the existing divisions less unwieldy than they are at present. A comparison between the Perambore division and either the Triplicane or Georgetown divisions would reveal the inequalities in this respect. Madras may be divided into about 30 electoral areas so as to secure the inclusion in each area of about the same number of rate-payers. The main point to be borne in mind is that this division ought to take place not solely with reference to the area but with regard to the population and the necessity for Municipal supervision. Congested areas and areas wherein trades are carried on require more adequate and thorough supervision than a scattered residential

locality composed of a large number of isolated bungalows and compounds. An alternative but less useful scheme would be to enable the more densely populated and important wards to elect two Commissioners instead of one so as to secure a more absolute equality in the treatment of the various subdivisions.

I now come to the question of nominations to the Corporation. In this matter I hold the view that the Government ought to nominate to the Municipal Council only those persons who might be advisers on special subjects—men versed in certain technical matters. I would have no objection to an educational officer or a non-official educationist being nominated to the Corporation. I would, without leaving it to chance, have one or two Police Officers of a superior grade on the Corporation so that there might be co-ordination between the constabulary of the city and the Municipality. I would further insist on the presence, in the Corporation, of some expert in accounts so as to make the discussions on the Municipal Audit and on the Budget less academical than they are at present. But apart from such technical advisers, there is, it seems to me, no necessity in a town like Madras for the nomination by the Government of any other class of men and I would therefore restrict the number of nominations to so many as are needed to supply to the Corporation the necessary technical knowledge in the various lines.

This need for expert ought really to be met by selecting a number of special institutions who would be entitled to elect representatives to the Corporation. The ideal towards which the Corporation should strive ought to be, in addition to the constitution of various wards for the election by the rate-payers of their Commissioners, to recognise a number of institutions of a special or technical kind each of which will send its representative. For instance, the Tramways Co., The Electric Supply Corporation, the Railway Administrations having an interest in the City, the European and Indian Chambers of Commerce might each elect its own representative and the

nominations by Government might be confined to the selection of persons who would not come in through these channels. In this matter, it must, however, be borne in mind that in a case like the Harbour Trust Board care ought to be taken that there ought to be no representation on the Corporation if the Board or Company seeks to get it without contributing towards the revenues of the Corporation.

It would also be a very useful thing to create an electorate of the graduates of the Madras University who might be asked to return to the Corporation some one who might safeguard the educational interests of the City in so far as they pertain to the Corporation. The Senate fulfils this function in Bombay but the Madras Senate is far too completely officialised for this purpose.

It is also clear that there exists absolutely no necessity of communal representation especially in Madras. We find that whatever may be the fact elsewhere, there has been no objection on the part of Hindu rate-payers to elect a Musalman and *vice versa* and instances may be given even from the present Commissioners of the Corporation to illustrate this freedom from racial prejudice on the part of the Madras rate-payer. I do not propose within the limits of this note, to discuss the wider principle of communal representation, but, it is noteworthy that in an article contributed by him to this journal in December last, Khan Bahadur Ghulam Sahib Mahagir wisely draws attention to the entire absence of analogy between the work done in Legislative Chambers and in Municipalities and he points out that in the latter, only matters of local interest and importance are discussed about which there can be no diversity of views based on differences of race. In Madras, where the communities have never asserted any rival claims or started any discussion about divergent rights, it is unnecessary and, in fact, it is not even wise to perpetuate the communal idea.

The Standing Committee of the Corporation ought to have a clear majority of elected Commissioners as in Bombay and its function ought to be mainly the scrutiny of the bud-

get and the periodical accounts and control over subordinates. It is a welcome feature in the administration of the Madras Corporation by Mr. Molony that he has constituted a number of Committees to deal with various subjects and this idea might be carried more thoroughly into practice by the regular constitution of various Sub-committees of the Corporation for dealing with problems of health, education, finance, Municipal appeals and so forth. It ought also to be the duty of the Corporation either by itself or conjointly with the Government to constitute a Schools Committee for enlarging the scope of primary education and of watching over the working of institutions designed to give such instruction, and administering funds which might be allotted or earmarked for the purpose. The functions of this Committee will get more and more onerous as the Corporation recognise more thoroughly its great duty of maintaining and extending primary schools so as to introduce fairly universal elementary education within the metropolis.

In regard to the office of the Chief Executive Head of the Corporation, he must be elected by the Corporation itself, as otherwise, he would be without any responsibility to the body whose resolutions he has to carry out. The provision in the Bombay City Municipal Act that he should be appointed by the Governor in Council but removable by the Corporation is hardly adequate. The Government, of course, may and ought to, for the present, impose restrictions on the field of choice, namely, by making it a condition that the nominee should be an executive officer under the Government having had a certain amount of experience in the administration of a district or taluk, but subject to such restrictions as to qualification, the election should be by the Corporation. The Government may, if it thinks fit, reserve a right of vetoing in this matter. The President of the Corporation should also, of course, be elected by the Commissioners.

Housing and Sanitation.

[By S M SWAAB]

THE housing problem is largely the result of high land values which create and foster congestion, and of the lack of transit facilities. It rightfully considers in its very broadest sense the environment of the dwelling house no less than the character of the dwellings themselves and the many varied uses to which they are put. The connection between real estate values and the housing problem and the effect of proper housing on fire prevention and protection, as well as problems of municipal taxation and recreation, etc., should all receive and are deserving of serious consideration. These and many others, in their several aspects, moral, legal, and physical, which each bears to the other and to the whole problem present a subject worthy of the best thought of the community.

The promiscuous piling of houses one on the other, so to speak, fronting on alleys or lanes or narrow streets, and the construction of tenements without adequate yard space, contrary to all ideas of decency and common sense and in defiance of every precept of sanitary science, rendering impossible the proper distribution of light and air, is responsible for much of the misery that is so graphically depicted in Rus's "How the Other Half Lives," that little that is new even fifteen years after the publication of that book remains to be said.

The width of the street and the distance between the houses and the proper amount of yard space can readily be made matters of statute, as can also the kind and nature of street paving, with a view to minimizing the dust. No fixed rule can be laid down governing the amount of space that should be allotted to parks, play-grounds, squares, social centres, etc., but the necessities of each community will be amply satisfied when it is recognized that these facilities are

required if the community is not alone to exist, but to prosper, and it can as readily be shown, if that be necessary, that it is a paying investment as well

The vast advances in sanitary science which have been made since the discovery of the germ theory of disease should have prevented in our modern cities at least, the occurrence of the old world conditions which give rise to a housing problem, but it is in defiance of and with utter disregard for this theory and all of the accumulated knowledge of mankind gathered on this subject during the last five thousand years that the residence sections of many of our modern cities have been built. The plague known as the 'Black Death' of the Middle Ages, which depopulated Europe, is generally ascribed to the ignorance and neglect of some of the fundamental principles of sanitation.

It may be said in the light of our present day knowledge that the scourge familiarly known as the "White Plague" for the spread of which bad housing is to the greatest extent responsible, can positively and undeniably be eradicated, and that twenty-five years of commercial prosperity and right living would for ever banish it from our midst. With proper educational facilities, thus insuring a decent respect for modern sanitary regulations, good housing (this includes good workshops and factories as well), correct living and working conditions, thus preventing overcrowding and too long hours of work, good water supply and ample sewerage, plenty of air and sunlight in abundance, with proper and sufficient food and with no hereditary taint and consequently no predisposition to the disease, this dread disease could be for ever wiped off the face of the earth. This, in my judgment, is the biggest dividend that could be reasonably obtained or that can be expected to be paid as a return on the investment of good housing, with all that that implies. The experience of those who have made this a life study and who have had ample opportunity to observe it in all of its phases has demonstrated the absolute truth of this statement.

The elimination of unnecessary noises and the prevention of the improper combustion of soft coal, commonly called the smoke nuisance, within the city limits, are both of them desiderata in the reckoning of the sanitary status of the city. The latter, where it occurs to any extent in addition to obscuring the beneficent light of the sun, is responsible for certain insanitary conditions culminating in a disturbance of the pulmonary functions of the body, which should not be tolerated, as well as being responsible for certain mechanical interferences with plant life, which is recognized as an invaluable agent in regulating, to some extent, the temperature of our city streets *

The United Provinces Municipalities Bill.

THE Royal Commission on Decentralization reported so long ago as 1909 that increased powers should be conferred on local bodies, and made various recommendations for the purpose. The Government of India in their Resolution of 28th April 1915, after discussing the recommendations of the Commission, "declared unhesitatingly in favour of a general policy of further progress" and left it to the Local Governments and Administrations to carry out this policy. The Legislatures of the several provinces have accordingly been engaged in framing new provisions and amending the existing Local and Municipal Acts, the professed object being mainly to give effect to the recommendations of the Royal Commission.

The Government of the United Provinces recently published the New Municipal Bill and in a circular addressed to the Chairmen of all Municipalities in the Province enunciated the general principles which it proposed to give effect to, and the attention of the public was drawn to the "proposals embodied in the Bill for the relaxation of official control and for the granting of complete freedom and complete responsibility" in

* Reprinted from the Can. Mun. Journal

the management of their affairs to Municipal Boards. Prior to the publication of this Bill, the Government also appointed a special committee to consider the best method of modifying the Constitution of Municipal Boards. The Committee made a special Report. The Bill was introduced in Council and referred to a Select Committee whose Report has been published in the United Provinces Gazette of 18-12-1915 together with the text of the Bill as revised by the Select Committee. The Revised Bill will be taken up for consideration at the next meeting of the Legislative Council.

The Bill before us contains nothing really new. It contains no clause which the comparative student of Municipal Acts cannot parallel from the Acts of some other province in India or from the English Town clauses, Water Works clauses and Public Health Acts of 1847-1875, in which will be found the seeds of all the Indian Municipal Acts. For it is now more than half a century since the flowers of English Municipal legislation were planted in the soil of the Presidency Towns in India, and our newer municipal acts have re-arranged the plants in fresh beds and introduced an occasional hybrid, but the flowers are always the same. In municipal legislation our draftsmen have feared nothing more than originality, every new municipal bill is put together by copying a provision here, a provision there, a phrase here and a phrase there, from an existing Indian municipal enactment. The United Provinces Municipalities Bill is no exception. The draftsmen seem to have made it a point of honour not to go beyond the four corners of the Indian Statute book.

Indian Municipal Acts are in the main Public Health Acts, all on the same model, and it is therefore difficult to understand why there is not a general Public Health Act for the whole of India which would relieve the overloaded municipal codes of two-thirds of their contents. A great deal of public time and money is continually being wasted on unsatisfactory

* Vide Local Self Government Gazette, Vol. I, p. 951

revisions of some 200 sections on public health in a dozen different provincial enactments. Even with reference to the constitution and Government, the powers and duties of a Municipal Council, seeing that the Bombay system is sought to be introduced throughout the whole of British India, it is a question whether an Act on the model of the English Municipal Corporations Act dealing with all municipalities should not be enacted reserving to Local Governments power to deal with matters requiring special treatment by rules made under the Act. The Legislative department of the Government of India could easily produce a better, clearer and more modern draft to be in force throughout India. We regret that this aspect of the question has not been considered by the authorities.

It will be interesting to examine how far the Bill as revised by the Select Committee provides for "relaxation of official control and for the granting of complete freedom and complete responsibility." We must confess to a feeling that the official control is not by any means relaxed by the Bill, nor do the municipalities get "complete freedom and complete responsibility." The Select Committee in their report say —

"One of the first questions considered by the Committee was the degree of control which would be retained by the Government or its officers over the working of municipal boards. The Committee fully accepts the position that the ultimate responsibility for securing a reasonably satisfactory system of Local Self Government must remain with the Government and that for this reason the Government must possess powers of effective interference in cases of gross mismanagement or arbitrary action affecting prejudicially any class of the community. We consider, however, that the provisions of the Bill as it stands—reproducing as they do in most respects the provisions of the present Municipal Act—go considerably beyond this necessary minimum, more especially as regards the power of interference in the details of administration and in the relation between municipal boards and their staffs. We recognise that a very great change both in the method and degree of control exercised by the Government will be effected by the removal of official chairmen from boards and their replacement by non official chairmen elected by the members of the board."

As observed by the Supreme Court of the United States,*

* See *Barnes v. Dt. of Columbia*, 91 U. S. 540

“ A Municipal Corporation in the exercise of all of its duties, including those most strictly local or internal, is but a department of the State. The Legislature may give it all the powers such a being is capable of receiving, making it a miniature state within its locality. Again, it may strip it of every power, leaving it a Corporation in name only, and it may create and recreate these changes as often as it chooses, or it may itself exercise directly within the locality any or all of the powers usually committed to a Municipality. We do not regard its acts as sometimes those of an agency of the State, and at others those of a Municipality but that its character and nature remaining at all times the same, it is great or small according as the Legislature shall extend or contract the sphere of its action.”

It is the sovereign will expressed in a solemn act of legislation that speaks the municipal microcosm into being and gives it life and power. The municipal constitution merely reflects the state constitution. The Municipal Council merely performs the duties and enjoys the rights and privileges confided to it by the State. In his famous Resolution on Local Self-Government, Lord Ripon stated that

“ The task of administration is yearly becoming more onerous as the country progresses in civilization and material prosperity. The annual Reports of every Government tell of an ever increasing burden laid upon the shoulders of the local officers. The cry is everywhere for increased establishments. The universal complaint in all departments is that of overwork. Under these circumstances it becomes imperatively necessary to look around for some means of relief, and the Governor General has no hesitation in stating his conviction that the only reasonable plan open to the Government is to induce the people themselves to undertake, as far as may be, the management of their own affairs, and to develop or create, if need be, a capacity for self-help in respect of all matters that have not for imperial reasons to be retained in the hands of representatives of Government.”

Though, no doubt all the powers exercised by municipal bodies are thus powers delegated to them by the Government, the question is to what extent the powers could be so delegated—how far the people may be entrusted with powers to manage all their own local affairs without any official control.

The Bill proposes to give the municipalities in the United Provinces a constitution on the bureaucratic model tempered by the democratic feature of statutory committees

The executive functions are divided between the council, committees, the chairman and the new executive officer, official control is retained in all important matters (Cls 18 to 19) Clause 17 of the Bill vests the Commissioner and the District Magistrate with certain powers for prohibiting the execution of resolutions or orders passed by or on behalf of a Board and prohibiting the doing of acts in pursuance of or under cover of such resolutions or orders, and under clause 19 the District Magistrate can always interfere in emergent cases "for the safety or convenience of the public" Power is reserved to the Local Government in clause 29 to remove a chairman for habitual failure to perform his duty Clause 239 of the Bill gives the Local Government very extensive powers not only for the guidance of Boards and the Government officers in carrying out the provisions of enactments relating to municipalities but also for the regulation and control of Boards in the exercise of the powers and the performance of the duties imposed upon them The net result of all this seems to be that the *legal* powers of the Municipal Boards are not increased though by providing an executive officer (for the larger municipalities) who will be appointed by the Boards, the *real* powers may be vastly increased So far with reference to the relaxation of outside control

As regards the granting of complete freedom and complete responsibility The Decentralisation Commission made certain very drastic suggestions granting freedom with regard to taxation, the budget, and the staff Clause 66 and 61 of the original Bill gave the Local Government power to prescribe the authority by whom and the condition subject to which budget estimates might be sanctioned This meant that no ultimate powers would be given to the councils, for the official sanctioning the Budget would always be able to make any alteration he liked in it The Select Committee have, however, added certain new clauses (65 A to E) which provide that Municipal Boards shall pass their own budgets and may vary them from time to time without any outside sanction

except in the case of indebted Boards in whose cases official control is maintained. The Local Government may also prescribe minimum closing balances.

When the Decentralisation Commission toured in the United Provinces, they found *ex-officio* chairmen in every Municipality except one. The "post of chairman was filled," as the Local Government frankly observe, "by an officer capable and ready to decide everything for the Board in many cases by disregarding the provisions of law." The Bill proposes to do away with this system, and the principle of election is recognised to a certain extent. The Board as a whole is made responsible for the acts of its executive officers. To this extent, there is freedom and there is responsibility. But with regard to taxation, the Bill does not concede the freedom suggested by the Decentralisation Commission. Numerous restrictions are placed on the Municipality's powers regarding the imposition and levy of taxes and the employment and punishment of its officers and servants. Complete control is also retained over transactions in real property (cl. 83).

The Decentralisation Commission was against the separate representation of classes or communities. Clauses 11 and 12 of the Bill, however, provide for the separate representation of minorities. This, we consider, is a needless and retrograde measure. Our views on the subject agree in the main with those expressed by Ghulam Mohamed Sahib Mahajan Khan Bahadur in the December issue of the *Local Self-Government Gazette*. While the principle of separate representation introduced in the Bill will not confer any substantial benefit on the classes supposed to be benefited, we are afraid that it is likely to accentuate the Hindu-Mahomedan problem and thereby add to the difficulties of administration.

Having considered the main principles embodied in the Bill, it would be of interest to refer to some of the more important clauses of the Bill.

Clause 2 (II) —The definition of 'owner' might include the person in charge of a vehicle or animal (Cf Madras City Municipal Act III of 1904)

Clause 2 (20) —The definition of 'street' may be so altered as to specifically exclude all private property

Clauses 9 to 11 deal with the constitution of the Board, and wide powers are reserved to the Local Government. Communal representation is also provided for, we have already dealt with this

Clause 11 (a) There is no reason why casual vacancies should not be filled up at once

Clause 12 —*Qualification of Electors* (a) There is no reason why the minimum amount of tax payable, minimum annual value, etc., should not be fixed by the Act itself. These ought not to be left to be dealt with by Rules made under the Act (Cf the Bombay and Madras Municipal Acts)

(b) We see no reason why occupiers of houses should enjoy the privilege by reason of mere occupation

(c) Persons owning properties in more than one ward should have votes in all the wards in which they own properties provided that the qualifying tax is paid in each of those wards

Clause 12 (g) *Election Petitions* Cls 12 (e) etc relate in detail to the procedure for the disposal of election petitions. Though the Decentralisation Commission recommended that provision should be made for settling disputes arising out of elections in the Civil Courts, cl 12 (g) provides for the Commissioner of the Division hearing the election petition. This should be done away with and the Civil Court substituted. Civil Courts are more competent to deal with important questions of status arising in election disputes.

Municipal members (a) There is no reason why the term of office of an *ex-officio* member should continue during the pleasure of the authority appointing him

(b) The power of accepting the resignation of a member is vested in the Commissioner. Thus, we think, ought to be vested in the Board itself.

(c) If a member acquires an interest in any contract or employment with the Board, he should *ipso facto* vacate his office. There should be no conflict between interest and duty.

(d) There is no reason whatever why a legal practitioner member should be removed from office, if he appears against the Board in any civil or criminal proceeding. Mere right of access which a member may have to municipal registers and documents counts for nothing. If a legal practitioner being a member of a Board gets information as such member and uses it against the Board, he will be guilty of unprofessional conduct. We have not heard of any case where a legal practitioner member has misconducted himself in the way suggested, and we do not see the necessity for any such express provision. This may be left to the good sense of the members themselves. The power reserved in cl. 22 (3) itself is quite sufficient to deal with this matter also.

(e) Clause 26 (2). There is no reason why the same person should not be elected as chairman for more than two terms of office in succession.

Taxation. (a) The definition of 'annual value' adopted by the Bill is likely to lead to complications. The proviso leaves it to the Board to fix an amount *which appears to it equitable*. The taxes on buildings and lands form the main income of all municipalities and the meaning of 'annual value' which is now well settled by several English and Indian decisions should not be disturbed.

(b) The Bill while recognising the right of the Board to amend the assessment list at any time (see cl. 101), provides that it shall ordinarily be revised only once in every five years. This is a very salutary provision, while avoiding unnecessary friction, it puts an end to a lot of corruption amongst unscrupulous subordinates.

(c) Clause 103 introduces unnecessary complications. The actual occupier is made liable for these taxes, the lessor, the superior lessor and the person in whom the right to let vests are also made liable. These nice distinctions might be done away with, and a simple method like that adopted by the Madras City Municipal Act might be introduced. The owner and the occupier might be left to adjust *relations* between themselves by contracting with each other.

(d) *Appeals against Taxation*. The District Magistrate or an officer empowered by the Local Government and the Commissioner in certain cases are constituted the appellate authority—(see cl 113). All appeals must be made to lie to a Civil Court.

Recovery of Municipal claims (a) *Forcible Entry* (cl 128). This power ought not to be left solely to the officer entrusted with the warrant. He must be made to obtain special orders for breaking open outer doors from the chairman as in the Madras Act.

(b) There is no reason why the surplus, if not claimed within a year, should become the property of the Board (cl 130 (3)). If the person entitled should be in a position to explain why he did not apply earlier, payment might be made to him.

(c) Taxes on buildings and lands alone are made a first charge on such buildings and lands. Considerable difficulty has been experienced by municipalities not having a charge for expenses incurred by it for improvements effected by them to buildings and lands under the provisions relating to public health, as for instance, where an owner is required to provide a drain and on his failure the municipality does it at his cost. A charge should be given to municipalities for such items also. In England, the local authorities have a charge for private street improvement expenses.

Building Regulations. The present Bill borrows the building regulations from other Acts and makes these regulations more elaborate and stringent than they now are. It is a question

for consideration whether all the penalties should not be relegated to a schedule and only one section enacted like section 420 of the Madras City Municipal Act

Fire Brigade The important municipalities must be required to maintain fire brigades, it must not be left to their discretion whether to maintain a brigade or not

Drains Cl 150 provides for the enforcement of drainage connections with public drains. The distance provided—100 feet—is too short. It may be raised to 150 feet. (Cf section 218 of Madras Act III of 1904.)

Scavenging and cleansing Provision is made for the Boards themselves undertaking the duty of house-scavenging, but the customary rights of scavengers and of agriculturists are preserved subject to proper safeguards

Streets As already observed, the Bill does not seem to make any distinction between a public and a private street, and even in respect of projections over what would be private streets, the Bill requires sanction to be obtained. This will be a great hardship. Reference may be made to section 248 of the Madras City Municipal Act

The expenses of levelling, etc., of a private street must be made a charge on the property as already stated

Elaborate provisions are made in the interests of public health, safety and convenience. The occupier of a building or land in front of which rubbish or nightsoil may be found is made liable (cl 221). This seems needlessly drastic. In the case of buildings unfit for human habitation, the Board itself is empowered to make a closing order which may be followed by an order of demolition by the Board itself. Even in England, an order from a Justice is obtained in such cases. Reference may also be made to sec 209 of the Madras City Municipal Act. It is desirable that powers should be reserved in such cases only to a Court of Law. In the case of patients suffering from cholera and the like, power is given to the Board (cl 227) to remove the patient itself to a hospital, provided a medical officer not inferior in rank to that of an Assistant Surgeon so advises

In England, in such cases, the order of a Court must be obtained prior to removal. As this involves interference with personal liberty, some safeguard must be provided for. Some specific provision must be made for women. Reference may be made to section 366 of Madras Act III of 1904. In cases of entry for purposes of inspection (cl 234), four hours' notice is too short. At least 24 hours' notice should be given.

The provisions relating to recovery of rent and charges—cls 237 A to E—are unduly drastic. There is no necessity to invest Municipal Boards with these extensive powers.

The Milk Supply in Calcutta.

THE Corporation at their meeting held on the 15th September 1915 generally approved the report of Captain Matson* and resolved that the Government of India be asked to lend the services of Captain Matson to the Corporation for a few months at as early a date as possible for the purpose of working out a complete scheme in detail on the lines of his present report.

The Quarter-Master-General in India, who was accordingly addressed on the subject, has expressed his regret that the services of Captain Matson cannot be lent at present without serious detriment to the military duties which are under his supervision. He is, however, prepared to lend the services of one of his senior dairy managers who has had an English training and who possesses considerable qualifications for the work. He suggested that this officer after first being taken over the place by Captain Matson, might do the work under the latter's guidance, and that Captain Matson would supervise the work by means of periodical visits. The Corporation would have to bear all the expenses in connection with the deputation which would be as follows—

(a) a deputation allowance of Rs 10 a day to the dairy manager in addition to his present emoluments which amount to Rs 550 per month and his travelling expenses

* Printed in the Local Self-Government Gazette at 912, 1035 & 1112, vol I.

(b) the cost of Captain Matson's travelling and out of pocket expenses

The Milk Supply Special Committee, appointed by the Corporation, recommended the acceptance of the offer of the Quarter-Master-General on the terms mentioned by him, and the Corporation accepted the recommendations

The Corporation desired that Captain Matson's report should be circulated to public bodies inviting an expression of their views on the subject. The opinion of 12 public bodies in Calcutta were invited, and 11 of them forwarded their views. The Committee decided that the opinions received should be considered after the scheme had been drawn up.

We reproduce below the views of the Bengal Landholder's Association —

The causes leading to the present state of affairs in the milk supply are —

1 Deterioration of the breed due to—

(a) want of introduction of fresh blood owing to scarcity of bulls for breeding purposes, (b) want of grazing ground

2 Diminution in the number of milch cows due to—

(a) *phooka*, (b) selling of calves and prime cows, when dry, to the butchers, (c) unhealthy surroundings

3 Rise in the price of fodder and food

The first and most needful step to be taken would be the entire removal of all trader's milch-cattle from within Calcutta and the housing of the cattle of private individuals within the town under more stringent rules than what exist at present. They suggest the establishment of a Dairy Farm by the Corporation or by some enterprising body with the help of the Government and the Corporation somewhere by the Railway lines outside Calcutta, on a commercial basis. If it is made a success, the result will be that all round Calcutta will spring up several Dairy and Agricultural Farms, a process which will

be fostered and furthered by suitable land being provided and monetary help being given in proper cases. Not only the price of milk but that of ghee, butter, etc., will be reduced. They suggest that even before giving effect to the recommendations of Captain Matson, the Corporation should start a place in or about Calcutta where cows are to be kept under ideal town conditions including facilities for grazing and improved breeding. They suggest the establishment of 4 or 5 central milk markets and the penalisation of the sale of milk elsewhere. At these central depôts milk should be tested and distributed to the retail depôts under strict precautions. At the central depôts the milk found bad should be destroyed and the inferior milk should be converted into 'Dahi', or 'Ghol'. The destruction of bad milk will put a stop to their future import. They recommend the introduction of some such system of standardisation of the milk in the central depôts as was in vogue in India and is even now practised in the towns and interiors of Northern India. They also encourage the establishment of Insurance companies for cows and the introduction of the co-operative credit system into the milk business.

Indian and European Cities.*

[BY H. V. LANCHESTER, VICE-PRESIDENT OF THE ROYAL
INSTITUTE OF BRITISH ARCHITECTS]

I SHOULD not embark on a comparison between the cities of India and those of Europe, pointing out the differences between them, did I not believe that the study of these differences would be of great value to you in offering a broader outlook in regard to the possibilities of city design, not necessarily by the introduction of European methods but rather by the opportunity it offers for seeing India more vividly

“What do they know of England who only England know?” is equally true of other nations. Therefore it is as well that many of you, comprehensive though your general

* An abstract of a lecture delivered at the Engineering College Madras

knowledge of Europe may be, should be enabled to carry away a somewhat more vivid impression of the methods and ideals of the growing cities of Europe

To begin with, while many of your cities vie in antiquity with ours, you will note that the existing city in Europe is on the average more stable than that in India. Though some have declined, there are but few deserted cities such as are not infrequent here. Despite wars and catastrophes, almost all the places that show prominently in the history of the last 2,000 years are "going concerns" to-day. While what is the case when we review Indian history for 3,000 years. Some of the glorious cities of the past exist but in name, others are inhabited only by the goats and the bats.

There must be a reason for this. I may not find it, but it seems worth seeking. Dynasties have risen and fallen in Europe as in India. The cities in Europe have stayed, in India they have gone with the dynasty.

May it not be that the European city was located by economic needs, the Indian by imaginative caprice? I have felt sometimes that the Indian potentate built his city as an artist would paint a picture. In loving over his possessions, some sites or other seized on his imagination as the basis of a scheme of beauty such as the European never dreamed of, strenuously he set to work to realise his vision and perhaps at the cost of a continuing economic strain, his race maintained and developed his undertaking. Once the guiding effort was removed there was no security for its permanence. European cities have been destroyed but they have persisted. Indian cities once gone rarely seem to revive.

This cannot be due to changed conditions. Conditions in India have changed far less than in Europe. The introduction of the European element has certainly had nothing to do with it.

At the moment the reason I have suggested seems the only one I can offer, and yet I should like to find one more

conclusive It may be that some of you can assist me I cannot help feeling that the Indian regards the lapse of a great city with more equanimity than would be felt in Europe, perhaps the influence of his religious teaching so definitely pointing away from materialism towards spirituality may be the secret The ultimate solution is not for me—only these few tentative limits may be ventured on here and now The European city being more firmly rooted is naturally more uniformly substantial, I do not mean merely its buildings, this might well be doubted, if one came to average up all classes of structure No, what I mean to imply is that there is a constant polishing up and various powers of adaptation always going on with a view to maintaining the city, as a working machine, at a high level, some of these efforts may be mistaken, some of them even vicious in their efforts but the effort is there

Now it is this lack of continued effort that I note in the Indian town which is apt to look too much, as if its inhabitants had doubts of its continuance, as if this or that little thing is hardly worth while in view of the fact that the city might take wings like so many of its predecessors leaving behind, perhaps, only the fine temple to testify to its former greatness You may think me a little fanciful, but possibly these wayward impressions may give you a hint or two as to the differences I set out to explain

That Hindu cities were planned with great care, the following quotations from Mr E B Havell collected from the translations of Ram Roy and four others will amply prove it It will probably be a revelation to modern architects to know how scientifically the problems of town planning are treated in these ancient Indian architectural treatises Beneath a great deal of mysticism which may be scoffed at as pure superstition, there is a foundation of sound common sense and scientific knowledge which would appeal to the mind of the European expert

For choosing the site of a village the *Manasara Silpa Sastri* declares that a careful examination of its position and soil is first necessary. The best site is that which slopes towards the east, so as to get the full benefit of the first rays of the morning sun. Those who have cultivated an Indian garden will appreciate the truth of this axiom. It would be near a stream running from left to right—the auspicious direction in which the sun moves across the sky—and the well digger should be able to find water at a depth of about seven feet.

The soil must be tested by its colour, smell, taste, appearance, and feel. Four different qualities were recognised — The first would be firm, of an agreeable odour, suitable for growing various kinds of shade and fruit trees, vegetables and flowers. Sites to be avoided were those inclined to the intermediate points, as N E, N W, stony ground, those in which human graves, disused wells, caves or refuse of any kind were found.

A rough practical means of testing the soil for the foundations was to dig a pit one *hasta* in depth, and then return the excavated soil into it. A stable foundation would be indicated by the soil at the top being higher than it was before and indifferent one, if it were of the same level, a bad one, which must on no account be used, if the surface was lower.

The true position of the cardinal points having been carefully ascertained by means of the shadow of a gnomon, rules for the construction of which are given in *Silpasastras*, the alignment of the main street of the village was marked out. The general plan of the larger villages followed that of the cosmic cross, and the so-called magic square, representing the four quarters of the universe, but the reader must not misunderstand the association of mysticism with the practical business of the Indian craftsman. All art in ancient India was held to be magic, and the magic virtues of these figures simply lay in the fact that the experience of many generations had proved that they were the best for purposes of defence and gave the most healthy, pleasant and practical

layout for an Indian village or town. The easterly axis of the plan ensured that the principal streets were purified by the rays of the sun sweeping through them from morning till evening, while the intersection of main streets by shorter ones running north and south provided a perfect circulation of air and the utmost benefit of the cool breezes.

The two principal streets which formed the arms of the cosmic cross were broad avenues, probably planted with umbrageous trees. The long one, running east and west, was called *Raja patha* (King's Street), the short one, which pointed north and south, was *Mahakala* (Broad Street), or otherwise *Vamana* (South Street). The road or wide-running path round the village inside the wall or stockade was called *Mangalavithi*, the way of auspiciousness, or good fortune, this being the path by which the village priests went daily in the performance of the rite of *pradakshina*, or circumambulation.

The centre of the village, at the intersection of the two main streets was the recognised meeting-place for the Council of elders which regulated local affairs. A banyan or a pipal tree planted on a mound sufficed for the mote-house or assembly-hall, except where the village was a large one, and could afford a pillared *mandapani*, or a pavilion of wood, brick or stone.

In this ancient Aryan village custom, one can trace the root of the idea of the *Bodhi* tree, or tree of Knowledge, for the tree of the village elders must have been associated with the wisdom of sages long before the forest tree became the place of meditation for the yogi who sought spiritual enlightenment. A symbolic or mystic meaning also attached itself to the Council tree, for, planted at the centre of the cosmic cross, it was the tree of Vishnu—the sun at noon and the all-pervading cosmic force. It stood for the mystic tree of which the sun and moon and stars were fruits and the blue vault of heaven the foliage.

In a small village the Council tree, or tree of Justice, would give sufficient shelter for the general meeting of the house-holders, who formed the Parliament of the Indo-Aryan village. They had the power of nominating all the Ministers—the Council of five—except the headman, whose office was hereditary, but who could be deposed by the Raja, the head of the clan, in case of any grievous offence against the laws of the Aryan community. In the larger villages and towns, the meeting-place of this general assembly would be in the parks or groves of sacred trees planted near the gates.

The *Manasara* gives the maximum width of the main village streets as 5 *dandas*. The others varied in width from 1 to 5 *dandas*. The size of a single cottage was reckoned as from 24 feet by 16 feet to 40 feet by 32 feet. They were generally grouped together by fours, so as to form an inner square or quadrangle—the “magic” of the square depending on the fact that it afforded the best protection for the cattle of the joint household when they were driven in from the pastures every evening.

Four cottages combined into a single habitation, with its own inner courtyard, was the next step in the evolution of the Indian house-plan. Such a house might belong to the chief herdsman, who was an important personage in the Aryan village communities, or to the headman of the village, both of which positions were hereditary. This was the derivation of a house-plan, eminently practical and suitable for a tropical climate, which is still universal in India for all classes, from the well-to-do ryot to the Maharajah, except where Indians prefer to make their surroundings uncomfortable and insanitary by adopting building fashions appropriate only for European climate and social conditions.

Just as the village cottage, or village hut, formed the unit of house-planning, so the village plan was the unit used to form the *mahalla*, or ward, in town-planning. The *Manasara* recognises forty different classes of villages and

towns, according to the extent of the lands owned by them, commencing with a village-unit which was 500 *dandas*, or 4,000 feet square, so that the extent of the largest cities would be 20,000 *dandas*, or about 30 English square miles. Of this area about one-third was devoted to building space, and the rest of the agricultural lands owned by the community. It should be observed that neither a village nor a town was usually square in plan, but a rectangle with the long sides running east and west, so as to secure a proper circulation of air even in the largest cities. In the description of Ayodhya given in the Ramayana, the proportion between its breadth and length is as one is to four. Pataliputra was 9 miles in length and $1\frac{1}{2}$ miles in breadth. One of the long sides generally faced a lake or river, an arrangement which provided bathing facilities for all the inhabitants, and obviated the necessity of building defensive works all round.

It will be interesting to examine in detail some of the village plans, of which eight standard types are given in the *Manasara*.

The simplest one called Dandaka, after the staff carried by *Sannyasins*, was specially intended for a hermitage (*ashram*) or other religious community. It consisted of from one to five long parallel streets running east and west, with three shorter ones intersecting them in the middle and at the two ends. There were two bathing-tanks near the N.E. and S.W. angles of the village, and various shrines appropriate for the particular sect to which the villagers belonged--the principal one being placed at the west end of the *Raja patha*, with its entrance facing the rising sun. Minor deities had their temples on the outskirts of the village, outside or inside the wall or fence, which had four large gates facing the two main streets, the smaller ones at the angle of the village. It contained from twelve to over three hundred houses. In the given plan each of the eight inside blocks had two rows of houses, the narrower outside blocks only one.

The outer blocks of houses were probably the bazaars placed near the gates of the town or village, both for convenience and for the purpose of collecting tolls. In the *Umagga Jataka* there are frequent references to the four bazaars placed at the north, south, east, and west, and serving their respective quarters in the King's city. The meeting of the cross ways, was, says the *Manasara*, the auspicious place for the assembly-hall, or for a temple of Brahma, which had four entrances.

The plan called *Padmaka* after the lotus leaf, is interesting as showing how sedulously Indian town-planners avoided the inauspicious lay-out in which the main streets run upon diagonal lines in the direction of the intermediate points of the compass, the objection to which are not merely sentimental. A plan with streets radiating in all directions from the centre of the village, like the spokes of a wheel, would be the first to suggest itself to an Indian designer, on account of its symbolism. He avoided it for very practical reasons. First, that it was bad for purposes of defence, as it gave an enemy many opportunities of establishing himself in the centre of the village by a sudden raid. Secondly, that it tended to the congestion of the traffic, and an uncomfortable plan of house and garden, especially in the middle of the village. Thirdly, that the streets would mostly run the wrong direction from the sun.

Another interesting village plan was based on the *Swastika*, the mystic sign derived from the "magic square," which, as stated above, represented the four quarters of the world and of the universe. The magic of the *Swastika* lay in the fact that in the Aryan camp it was a formation used for defending the four gateways, it was also the Indo-Aryan religious compass, indicating the apparent movement of the sun across the heavens, which movement still forms part of Hindu religious ritual in the performance of *pradhakshina*, or the circumambulation of a shrine, keeping the right side

towards it. Philosophically, the sign represents the principle of evolution, the reverse sign, associated with black magic and representing involution, was adopted by certain schools of Hindu philosophy. In this plan the direction of the block houses in each quarter of the village indicated the movement from left to right.

Now the European whose guiding rules are much less detailed than these, was thrown much more on his own resources and for this reason perhaps his cities, defective though they may be in some respects, are based more closely on obviously logical needs, such as those firstly of defence and subsequently of commerce and industrial facilities.

I would not for a moment suggest that you should disregard the useful suggestions of your own teachers but I think, there is the necessity of appreciating the points in which they are applicable to present conditions and of interpreting them broadly in the light of modern practice, so that developments in the future are not hampered by a misunderstanding of the true intention of these sastias and of the merits that it was their aim to secure.

Notes.

PROGRAMME OF WORK FOR THE COMING OFFICIAL YEAR —
The world struggle that is now going on has already crippled the slender resources of local bodies even in this country which is yet, comparatively speaking, free from the direct miseries of war, and must necessarily cause the elimination from the programme for 1916-17, all but very necessary works involving capital expenditure. But works which have been started should not be abandoned and we hope that every effort will be made to carry them through. Great care must be taken in framing the budgets for the coming official year, and while strictest economy must be observed, works already undertaken must not be starved. We shall be glad to receive

for publication a short statement of the more important works projected by Local Bodies

VILLAGE LIBRARIES —In connection with then experiment for establishing village libraries, the Carnegie United Kingdom Trustees have made an offer to the Staffordshire Education Committee of a sum of £5,000 spread over five years for the carrying out of an experimental scheme for the establishment and conduct through the schools in the country elementary area of village libraries. The Committee has accepted the offer. It is proposed that the Central Department for the books should be at Stafford and that the books should be sent in boxes to each school in rotation, each set of books to be retained for three months at a particular school. It is suggested that the head teacher of the school should be Librarian. The whole of the expenses will be borne by the Trustees for the first five years.

[Madras]

Dharapuram Municipality

FIRST CONSTITUTION —The Governor in Council has notified that until further orders (1) the maximum number of Municipal Councillors to be appointed for the time being for the newly created Municipal Council of Dharapuram shall be twelve, (2) none of the councillors shall be elected, and (3) the Chairman shall be appointed by the Governor in Council.

The Revenue Divisional Officer, Erode, has been appointed Chairman of the Municipality. We cannot object to the appointment of an official chairman as his guidance may be useful in the first formation of the Municipality but we doubt whether the Revenue Divisional Officer of Erode (which is far away from Dharapuram) will be able to do justice to his new and responsible office.

Madras Corporation

WATER-SUPPLY AND DRAINAGE WORKS —According to a recent estimate, the total cost of the Special Engineer's

water-supply and drainage schemes pushed to completion is as follows —

Water Works	Rs 68,09,500
Drainage Works	„ 1,56,92,700
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Total	Rs 2,25,02,200
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Up to March 31st, 1915, the expenditure has been as follows —

Water Works	Rs 22,00,647
Drainage Works	„ 42,31,669
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Total	Rs 64,32,316
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The additional expenditure for the incompleted year 1915-16, is about 12½ lakhs, divided between water works and drainage works in the proportion of 5 7½

For the forthcoming year, the Special Engineer had proposed a programme of work costing Rs 19,92,696. Under existing circumstances, it is considered extremely unlikely that such an amount of money can be found. The programme has therefore been cut down to Rs 11,61,000 which represents expenditure to which the Corporation is practically committed under current contracts. We have, however, grave doubts whether the Corporation will be able to carry out even this modified programme as we are afraid that the finances of the Corporation are at a low ebb. We anxiously look forward to Mr J C Molony's budget for the coming year.

Srirangam Municipality

CONSERVANCY LANES — The application of the Srirangam Municipal Council for a loan of Rs 54,000 required for the acquisition of land for opening conservancy lanes in the town has been sanctioned. The amount is to be repaid in thirty equal annual instalments of Rs 3,122.

[Mysore]**Bangalore Station Municipality**

ELECTRIFICATION OF WATER SUPPLY—The Bangalore Station Municipality have resolved to have pumps of water works electrified from the Cawery Falls Power Station. The scheme is estimated to cost about Rs 50,000

[Bombay]**Bombay Corporation**

APPOINTMENT OF EXECUTIVE HEALTH OFFICER AS PROFESSOR OF PUBLIC HEALTH—Counsel having given opinion that the Corporation have no power to agree to the appointment of the Executive Health Officer as Professor of Public Health at the new School of Tropical medicine in Bombay, the Corporation decided to approach Government with a request that they will be pleased to undertake legislation for the amendment of sec 74 (3) of the City of Bombay Municipal Act in the following form—"The Executive Health Officer may accept for such period as may be sanctioned by the Corporation any appointment whether honorary or otherwise having for its object the promotion of public health whether by means of education or otherwise, and which appointment in the opinion of the Corporation would not interfere with his duties as Executive Health Officer."

MUNITIONS FOR THE WAR

The Bombay Corporation have requested the Municipal Commissioner to place at the disposal of Government the Municipal workshops for the manufacture of munitions as it is done in Calcutta

[Bengal]**Calcutta Corporation**

REVIEW OF THE ADMINISTRATION REPORT—At its ordinary meeting held on the 26th January, the Corporation after a long discussion of the Administration Report passed the following Resolution—(1) That the Corporation express their opinion that an additional Municipal Magistrate should be appointed

(2) That in view of the delay in bringing before the Council the amendment of the Municipal Act the Corporation are of opinion that the amendment of the sections relating to food and drugs should be taken at once. They think that this is very urgently required and is not likely to be a contentious measure.

(3) That, subject to the purport of the above amendments being embodied in it, the Review of the Administration Report and Statement of Accounts for the Year 1914-15, be adopted.

Howrah Municipality

The scheme submitted by the Commissioners of the Howrah Municipality for providing drainage to a portion of that Municipality has been approved by the Governor in Council. The particulars of the scheme are as follows —

(a) The scheme proposes to deal with the drainage of the area comprised in blocks Nos. I and II of South Foreshore section as well as the area known as the Bhaipara Bickfields within the Howrah Municipality. The main feature of the scheme is the exclusion of all drainage from the Bengal Nagpur Railway, Shalimar Woodyard, and diverting it along Juggut Banerjee's Ghat Road, and consists in the construction of a sewer drain along Juggut Banerjee's Ghat Road, an open drain along Bhaipara Road, as well as the widening of the Bhaipara Road to a width of 30 feet.

(b) The estimated cost of the scheme is Rs. 35,287.

(c) There will be no cost of maintenance.

(d) The sum of Rs. 35,287 on account of the cost of the scheme will be met as follows —

The General Revenue Fund of the Municipality	Rs. 22,787
Contribution from the Bengal-Nagpur Railway	„ 12,500
	<hr/>
Total	Rs. 35,287
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Dacca

PRIVATE MUNIFICENCE — Babu Gauri Nilai Saha Sankhami of Dacca has made a donation of Rs 25,000 towards the construction of the new Mitford Hospital, Dacca

[Punjab]

Kaithal Municipality

QUALIFICATION OF VOTERS — The following amendment has been made to Rule II of the rules prescribing qualifications for voters — “But every qualified voter shall be entitled to as many votes, not exceeding five, as he possesses, pays or receives, qualifying units of property, rental, land revenue or income ”

Public Health and Sanitation.

Model Lectures on Sanitary Subjects

[BY LIEUT -COL H THOMSON, I M S, ACTING SANITARY COMMISSIONER, MADRAS]

Anchylostomiasis or Hook worm disease

IN previous lectures you have been told about many kinds of small life which produce illness by means of the poisons which they make in the bodies of men and animals

The parasite about which I am going to talk to you to-night acts in a different manner. It does not produce a poison but it gets into the bowels and there sucks blood to such an extent that it produces great weakness, suffering and liability to other diseases

Although it is much larger than the little organisms which, as you have been told, produce cholera and plague, it is a very small animal. There are several kinds, but the one that is commonest in Madras only measures from one-half to one-third of an ungli in length and one-sixtieth of an ungli in thickness

You will ask how it is that such a small animal can do harm and the answer is that it is because of the large numbers that may be present. If you were to cut your finger you might lose a few drops of blood and that would do you no harm, but if you kept the

out open so that one drop of blood fell from it in a minute, at the end of the day you would have lost more than half an oblock of blood, in two weeks you would have lost a seer of blood and in two months all the blood in your body would have drained away. It is in this way that this tiny worm works. One worm could not take up more than one drop of blood in a day, but if there were a thousand worms you would be nearly as bad as in the example I gave you of a man losing only one drop of blood a minute. Of course during this time your body would be making new blood, but it could not make it fast enough to meet such a heavy loss as one drop per minute. Small as these worms are, they do a relatively great amount of damage, (1) because they may be present in great numbers, (2) because they waste a great deal of the blood they suck, using up only the fluid part of it and (3) because they frequently change their places, inflict new bites, while the blood from the old bite continues to ooze away. Thus it comes about that though a few worms may not do a great deal of harm, very much fewer than one thousand might give rise to serious ill health.

In the old days before we were able to observe these small forms of parasitic life by means of the microscope, the state of ill health produced by hook-worms was known as "Tropical Anæmia," that is, as hot country bloodlessness. It was supposed to be the result of great heat, of unsuitable food or perhaps of repeated attacks of other weakening diseases, such as malaria and dysentery. We now know that it is just the other way about and that the weakness and ill health produced by the constant loss of blood brought about by these small worms, while not often directly fatal, will often turn the scale and lead to death from an attack of disease that otherwise might easily have been recovered from.

Medical men who work in hot countries where this parasite is common must, therefore, be very watchful when attending on cases of bloodlessness with indigestion and general constitutional weakness. If these small worms are allowed to increase in number in the bowels and to remain a long time they may bring about results, in addition to the bloodlessness, which cannot be cured even if the worms are got rid of. Serious heart and kidney disease as well as a general dropsical condition may be brought about.

What then are the symptoms by which we may recognise a serious attack by these parasites? In addition to growing weakness and inability to work there may be a feeling of pain and discomfort in the upper part of the belly. This latter is usually increased when the part is pressed upon, but, curiously enough, relief can often be obtained for a short time by taking food. The appetite sometimes fails but more often it is greatly increased, and if this be satisfied in an unwise manner it may give rise to serious digestive troubles, dilatation of the stomach with colic and the passing of wind both by the mouth and the bowel. There may be irregularity in the action of the bowels, sometimes with looseness and sometimes with constipation. The appetite sometimes changes in a curious manner and patients want to eat all sorts of indigestible things such as mud, earth and lime. As you will learn later, this is an extremely dangerous thing to do as it will not only increase the indigestion but it will probably add a large fresh infection of young worms, which live in mud and damp earth, and so produce more trouble than ever.

Fever of a low type is very common but cases occur in which the heat of the body is lower than usual.

In some cases the trouble may grow at such a rate that the patient dies in a few weeks or months, but such cases are rare. More usually the disease is very chronic, sometimes better, sometimes worse but, on the whole, getting slowly worse for a number of years. Should the disease occur in young people before puberty, growth and further development are apt to be stunted.

If we suspect such a case of illness to be due to these small worms it is very easy to make sure. All we have to do is to examine some fresh excrement under the microscope. In a case of this disease large numbers of easily recognized eggs will be found. They are quite invisible to the naked eye and only measure one-third hundredth part of an inch. They have a characteristically clear shell which enables us to distinguish them from the eggs of other worms which may be present in the bowel.

Some little description of these tiny worms may be given here. As I have already told you about their size, this need not be repeated. When seen in a preserved specimen they look like short little bits of cotton thread hanging on to the wall of the bowel but in fresh specimens they may be red from the blood they have sucked or blow -

from staining with liver juice. There are male and female worms, usually about one male to three females. The female is slightly larger than the male. The tail end is usually thicker than the head. The mouth is at the extreme front end of the worm and the lips of it are wavy. At the front side of the mouth there are two horny plates shaped like half moons and by means of these the worm fixes itself to the wall of the gut. Farther back in the mouth there are four sharp cutting teeth, arranged in pairs, two in front and two behind. With these they cut through the delicate lining membrane of the gut and so cause the blood to flow.

It is not known how long these worms live but their life may be quite a long one, some say months, others years. During the whole of their life in the adult (fully developed) form the females are passing out a prodigious and continual stream of eggs. It is very important to know what becomes of these eggs as on this knowledge depends our means of preventing further infection with this scourge. The worms themselves are only found in the upper part of the gut but the eggs pass right along the whole gut and are thrown out with the excreta, and as I have told you, can be readily recognized under the microscope. It has been attempted to test the seriousness of a case of this disease by counting the number of eggs in a small known weight of the excrement. Good authorities say that if there are as many as five eggs in a dhan (grain) that will correspond to about one thousand worms, male and female, in the upper bowel.

If the excrement is kept moist—and this condition is a very important one to remember—the hatching out of the eggs goes on rapidly and in a couple of days a very small flat worm emerges from the egg. This little worm moves about very actively and eats greedily of any particles of food it may come across. In about a week it has grown to about four times the size it was at first and it now becomes sluggish and ceases to eat or to grow. It is necessary now for the worm to get out of the excrement and into moist earth or muddy water, and this is another very important point to remember. In such a situation it may live for weeks or months, moving about slowly in the wet earth or muddy water and climbing up the stems of grass wet with dew. It is at this stage that it becomes dangerous and can infect new victims or re-infect its original hosts.

People who have to do with the soil such as farmers, tea-planters, brickmakers, etc., naturally get earth into their hands and if this is not very carefully cleaned off before food is taken, some of the earth containing these young parasites may be swallowed with the food. It must be remembered that at this stage the young worms are so small as to be almost invisible to the naked eye. They might also be swallowed in water if care is not taken and the mud is stirred up when the water is drawn. In such cases, as I told you where people eat earth to relieve the indigestion caused by these worms, it is easily seen that a very heavy re-infection is possible. Children also who are crawling about the ground and who put all sorts of things into their mouths often get infected.

This is what is known as the direct method of re-infection but there is another and possibly a much more important way in which people may get infected. It is now known that these young worms can make their way through the skin. A very celebrated doctor was studying the growth and life of these parasites. He accidentally spilt some water containing the young worms over his hands, and noticed an hour or two later that his hands were red and itching. He subsequently had an attack of illness showing all the signs of infection with these worms. This struck him as being very remarkable and, to prove if infection did really take place through the skin, he went to a hospital where there was a patient who, on account of an accident, had to get his leg cut off. An hour before the operation, when there was too short a time for the worms to actually enter into the man's body, he placed some young worms on the skin of the leg that was to be cut off. After the operation he examined small pieces of skin from the cut off leg under the microscope and was able to show that the young worms had actually got through the skin. They had crawled into the small pockets out of which the hairs come and from that position had bored their way right through the skin.

You will readily understand how important this method of infection is when it is pointed out that no amount of washing of the hands before taking food, or of care to drink only clean water would stop it. The one and only precaution that would do any good is to stop the young worms from getting into the damp earth or muddy water which is essential to their development. In this connection

it may be mentioned that in Assam, where infection by this worm is almost universal, there is an inflammation of the feet known as ground itch (one pani ghao), and this has been attributed to the irritation caused by the young worms as they bore their way through the skin. Naturally, when walking about in the early morning, when the ground is still damp and the dew is on the grass, people are in a position to get thousands of these young worms on to their feet.

It is now supposed that the young parasites, getting through the skin, pass into the blood stream and are carried by it to the lungs. While this is happening they begin to grow again and pierce their way out through the delicate lining of the lung air cells, thence they pass into the air tubes and up into the mouth where they are swallowed in the saliva. The passage through the blood is supposed to strengthen them so that they are not killed and digested in the stomach but, passing through this, get into the upper part of the bowel where they fasten themselves to the lining and rapidly attain to their full size and mischief working capacity.

Having now studied the habits of life of this very dangerous little beast we are in a position to ask the question "Can anything be done to cure people who are afflicted with it?"

The answer is yes, but coupled with this answer, it cannot be too strongly insisted on that "prevention is better than cure." Should however a person have been unfortunate as to get infected in ignorance and before the means of prevention were known, he can be easily cured. The cure is effected by certain drugs but unless these are used in a proper manner, you will poison the patient as well as the worms. It is better therefore to leave the question of cure to medical men who thoroughly understand what they are about and to restrict our attention to prevention.

With regard to most evils that afflict this world it can be said that "prevention is better than cure" and, with regard to this particular one, prevention is so easy that the truth of the proverb may be said to be doubled. The success of our preventive operations is certain, provided we have the willing co-operation of the whole population concerned. It is therefore of the greatest importance

that you should pay particular attention to what I am now going to tell you. I have first to recall to your minds the two points on which I laid particular stress earlier in the evening. These were (1) that unless the excrement of persons harbouring hook-worms were kept moist, eggs of the parasites would not hatch out, and (2) that if the young worms after a time could not get access to moist earth or muddy water, they would die. On these two points all our preventive measures are based, and perhaps you will be beginning to see why I demanded the willing co-operation of all the population. In fighting this scourge the people are not put to any inconvenience. They are not asked to submit themselves to medical inspection, to hospital or house visitation, to isolation or quarantine. They are only asked to follow one simple rule and that is, *that the indiscriminate relieving of the necessities of nature in all sorts of places, public and private, by night or by day, must be put a stop to*. The excrement of persons carrying these worms is the source of danger and unless the whole of it can be collected and adequately dealt with by the central authority, all efforts to stop the scourge will prove useless. It is very important to remember in this connection that a person may only be harbouring a few worms, a couple of dozen or so, and that these may produce no appreciable ill effects on him. They will however be responsible for many thousands, perhaps millions, of eggs and thus such a person's power of spreading the disease may be a considerable one. At the risk of being tedious I must again insist that it is the willing co-operation of all the people that we demand, if the co-operation be intelligent as well, so much the better, but it is willingness that is the essential. A sufficiency of properly constructed privies must be provided and the use of them made obligatory. The vessels in the privies should be frequently removed and replaced by clean ones which have been washed out with phenyle or some similar preparation. The contents of the vessels should be removed to a good distance from any inhabited place and also from any source of drinking water, and there mixed with a large quantity of dry earth or sand and spread out in the sun to dry. It has also been suggested in suitable localities that they should be mixed with a sufficiency of paddy husk or other vegetable waste and burnt.

So much for the dry methods of checking the life of this dangerous parasite, but there are many places in India, and notably

places where the disease is commonest, where the rain is so continuous that dry earth or sand cannot be got and, as you have been told, wet earth is the worst thing possible. What are we to do there? In such places, and they are numerous on the West Coast, in Assam and in Burmah, the best method is probably that discovered by the Chinese for themselves. How they discovered this without the aid of microscopes to see the development from the eggs of the young worm and to study their habits, is a mystery, but discover it they did, as well as many other wonderful things. The method consists in emptying the night-soil from the privies, etc., into large cemented water-tight pits or tanks. The excrement is kept in these pits for several months. The parasitic eggs hatch out but, as you have been told, the young worms soon die if they do not get access to moist earth or muddy water. This method has the advantage that, after it is quite safe, the night-soil can be used in cultivation with a resulting great improvement in the crops.

To sum up, all the precautions we can adopt in fighting this widespread and mischievous scourge, may be expressed in the one word *cleanliness*.

In England there is the saying that cleanliness is next to godliness. Now India is a very godly land and it may be safely asserted that if India were as essentially clean as she is godly, the country would be a much safer and pleasanter place to live in. I use the expression essential cleanliness because it is often claimed for the Indian people that they are cleanly. Certainly the practice of ablutions, both ordinary and ceremonial, is almost universal among them, but it is highly probable that in the course of ages, the real meaning of such observances has been forgotten and only the practice remains. It cannot however be claimed as a clean practice to transfer the dirt, often dangerously infective dirt, from your clothes and bodies into the water which you and your neighbours are going to drink. Yet how few people in India think of this?

Now that modern science has succeeded in giving practical demonstration of the reasons for which these old ceremonial ablutions were ordered, it becomes the duty of every one to carry them out in the spirit as well as the letter.

If men were solitary beings or if, even when living in communities, they frequent their place of abode like the nomadic tribes of

Arabia, harm might not result from habits which are all too common in India, but when communities, whether large or small, live in places which, from one reason or another, cannot be abandoned, it becomes an elementary but essential part of good citizenship so to regulate your lives and habits that they do not become a source of danger and annoyance to your neighbours

Mixed Vaccination for Several Diseases

"One of the most signal advances recently made in the prophylactic use of vaccines," says a medical authority, "is 'Castellani's' method of combined vaccination, which is now being used on an extensive scale in France and Italy." Dr. Castellani has prepared ten combinations of vaccines, each containing the micro organisms of from three to six different diseases and these are giving highly satisfactory results. The combinations include cholera, typhoid and two para typhoids and cholera, bubonic plague, typhoid and two para-typhoids

Small-pox and Vaccination

1 SMALL-POX is a contagious eruptive fever. The infection may be caught by coming in contact with the person suffering from the disease and through the air in the vicinity of the patient, also by various articles—especially of clothing and bedding. The patient gives off the infection from the beginning of the illness even before the eruption, and he continues to give off the infection for a length of time which varies according to the length and severity of the attack and the time of the separation of the crusts. After getting the infection into your system, it ordinarily takes 12 days before you begin to feel ill, and in one or two days more the eruption begins to appear.

2 The small-pox patient should, whenever possible, be sent to a small-pox hospital, if there is one, where he would be treated gratis, should he so desire. The hospital is generally more convenient and better adapted for the patient than the average Indian house, while the risk of the patient infecting friends and neighbours is removed. Should, however, the removal to the hospital be for any reason impossible or impracticable, the patient should be isolated in the largest and most airy room available in the house, and preferably

upstairs. The room should be well ventilated but not kept too cold. Cloths or sheets soaked in carbolic lotion and kept constantly damp with the lotion should be hung over all the doors and windows of the patient's room to prevent the spread of infection. A very effective disinfectant is pure carbolic acid of which a solution can be made consisting of 5 per cent of carbolic in water. It is usual in Indian homes to keep bunches of *nim* leaves (mangosa leaves) in the small-pox patient's room and in the house generally. These leaves have a great medicinal and sanitary value, and the practice is therefore recommended.

3 Only one person should be in attendance on the patient. On leaving the sick-room to mingle with the family or go out in the street, the attendant should take a bath and put on fresh and clean clothing. The old clothing should be soaked in the carbolic lotion. The attendant should always avoid inhaling the breath of the patient.

4 If the patient is not removed to the hospital, a qualified medical practitioner should always be called in, even in cases where the disease appears to be mild, as serious complications such as diseases of the eyes and affections of the ears leading to blindness and deafness may set in at any time.

5 The bowels should be kept moderately open. Fruits such as plantains (of the *peyan* variety) and figs may be used with advantage. The eyes should be carefully washed and bathed several times daily with warm milk and water, or, if affected, with warm alum lotion. After crusts and scales have entirely disappeared, hot baths should be given every day, with occasional oil-baths.

6 The spread of small-pox is combated by vaccination. Indeed, it may be said that no disease can, with such certainty, be prevented as small-pox by vaccination. Experience and statistics show that vaccination protects the individual, and greatly diminishes the amount of small-pox in the community. Successful vaccination in infancy and *re-vaccination afterwards once in every seven years* will insure you against attacks of this dreadful and disfiguring disease. As soon as possible after the child is born, it should be vaccinated.

7 To obtain a lasting effect, vaccination must be repeated at suitable intervals. Ordinarily, vaccination during childhood is sufficient to protect the child until it reaches the age of puberty at

WATER SUPPLY

which period, therefore, vaccination must be resorted to again, effect of the original vaccination ceases after the lapse of seven years

8 Thanks to vaccination and re vaccination, small-pox has almost died out in Europe, America and Japan, although but a short time ago, before the introduction of compulsory vaccination, epidemics of the disease raged in these countries. In France and Germany, *where vaccination and re-vaccination are compulsory*, small-pox is almost an unknown disease, the few cases which do arise in these countries are usually imported from others.

9 It therefore behoves every citizen to see that all those whose health and safety he cares for, are *vaccinated at once*, if they have not already been vaccinated, or, are *re-vaccinated* if more than *seven* years have elapsed since their previous vaccination. It is equally important that if small-pox unfortunately makes its appearance in any household, the parent or guardian should at once take the *necessary precaution of isolating the patient*.

Water Supply.

The Madras Water-Works Regulations

THE inauguration of the New Water Works in Madras, while giving a plentiful supply of water to the inhabitants, has resulted in an increased waste of municipal water. It was reported that during the two weeks following the opening of the works, the consumption of water in the city increased from 8 million gallons to 19 million gallons per day, in other words, from 16 gallons to 38 gallons per head per day. The waste implied in this increase of "consumption" is no doubt partly due to old and defective pipes and leaky joints, but it is also in a large measure due to the indifference and callousness of the average ratepayer who would keep the water-tap open and allow the water to waste while he was leisurely cleaning his teeth, washing his clothes or chewing his betel. Few of us, when we open the tap and get a copious flow, realise or even think of the intellect or wealth spent in securing that flow. The alarming waste which followed the improved water supply greatly exercised the President and the Special Engineer of the Corporation, and they have now embodied and issued in a booklet the regulations and rules for the prevention of waste, contamination and misuse of municipal water.

The system in Madras is, unlike in certain other cities and towns, the *constant supply system* which conduces materially to the health and comfort of consumers. Mr. Madeley has himself convincingly shown in these pages, the superior advantages of the constant supply system and pointed out the disadvantages and dangers of the intermittent system* and he has therefore naturally, in spite of the large waste, decided in favour of the former system for this city. The system necessitates the adoption of certain precautions against waste, neglect and misuse, and it is these precautions that are enumerated and described in the booklet now issued by the President.

The booklet, for a copy of which we are indebted to Mr. J. W. Madeley, is aptly called the "Water Works Hand Book," and consists of three parts (i) introduction, (ii) regulations for the prevention of waste, contamination and misuse of water and (iii) plumber's rules.

(i) The Corporation have made a regulation that all work in connection with water fittings for houses, etc., shall only be executed by plumbers who have been licensed as such by the President. We note that two types of meters are used by the Corporation (1) with straight reading dials and (2) with circular reading dials. Of the latter there are as many as six types in use, diagrams of the dials of these meters are given at the end of the book. We are sure these illustrations will be found very useful to consumers who will be able to follow and check the readings taken by the Municipal subordinate. By the courtesy of Mr. Madeley, we have been able to reproduce the diagrams and the instructions.

(ii) The second part deals with the following points and are those embodied in Mr. Madeley's Report on the distribution scheme which has since been approved by the Corporation —

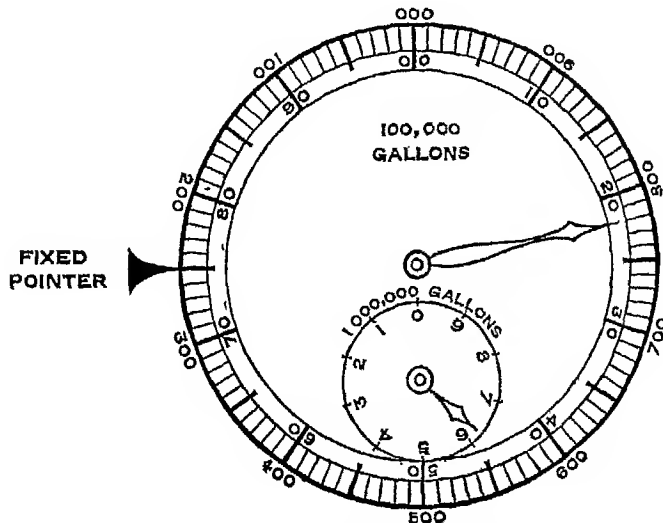
1 Application for water-supply 2 House service connection,
3 Classification of pipe service 4 Meters 5 Connection to the main
6 Cost of connection 7 Private pipes and fittings
8 Alteration of service pipes 9 Inspection by Municipal authorities
10 Service pipes laid at consumer's cost 11 Specification of pipes and fittings
12 Lead pipes 13 Cast Iron pipes 14 W. I. and Steel pipes
15 Protection of Iron and Steel pipes 16 Brass and Copper pipes
17 Taps, etc 18. Bath and Lavatory

* Vide Vol I p. 523

Fig. 1

SIEMENS & ADAMSON'S Water Meter

Reads 622,250 gals.



Instructions for reading the dial Registering in gallons

In all meters, up to 6 inch, each revolution of the hand corresponds to a flow 1,000 gallons

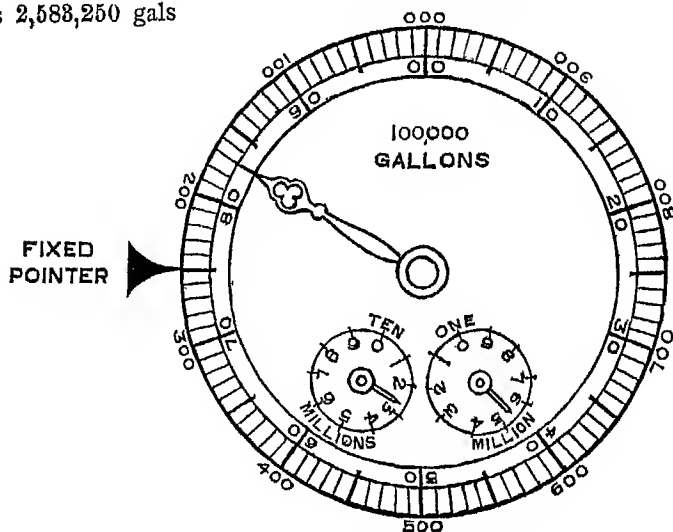
In the dial of this meter are two large circles and one small inner circle. The outer large circle referred to by the fixed pointer, represents 1,000 gallons each revolution, it is divided into 100 equal parts of 10 gallons each. The inner large circle, referred to by the movable hand, represents 100,000 gallons each revolution, it is divided into 100 equal parts of 1,000 gallons each. The small inner circle represents 100,000 gallons each revolution, and is divided into 10 parts of 100,000 gallons each.

In the above figure the hand in the small circle has last passed 6, indicating six revolutions of the large hand, or 600,000 gallons, the large hand indicates 22,000 and the fixed pointer 250 gallons, so that the meter reading is 622,250 gallons.

Fig. 2.

SIEMENS & ADAMSON'S—Water Meter.

Reads 2,588,250 gals

**Instructions for reading the dial****Registering in gallons**

In all meters up to 6 inch, each revolution of the hand corresponds to a flow of 1,000 gallons. In the dial of this meter are two large circles and two small inner circles. The outer large circle, referred to by the fixed pointer, represents 1,000 gallons for each revolution, it is divided into 100 equal parts of 10 gallons each. The large inner circle, referred to by the movable hand, represents 100,000 gallons for each revolution, it is divided into 100 equal parts of 1,000 gallons each. The small inner circle on the right side represents 1,000,000 gallons for each revolution, it is divided into 10 parts of 100,000 gallons each. The small inner circle on the left side represents 10,000,000 gallons for each revolution, it is divided into 10 equal parts of 1,000,000 gallons.

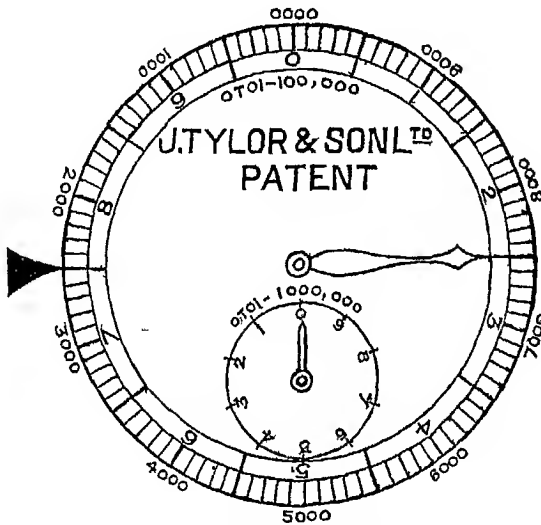
The above figure has four circles of figures. The circle of greatest value is the small circle marked "ten millions," and on the figure the hand has last passed 2, indicating two millions. The next circle in value is the second small circle marked "one million," and in the figure the hand has last passed 5 indicating 500,000 gallons. The next is the large inner circle, and the division or figure the hand is pointing to indicate 83,000 and the fixed pointer 250 gallons, so that the meter reading is 2,588,250 gallons.

Fig. 3.

J. TYLOR & SON

Patent Rotary Water Meter

Reads 252,500 gals



Instructions for reading the dial

Registering in gallons

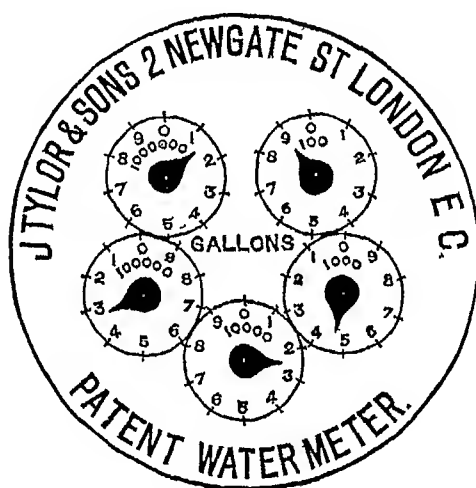
In the dial of this meter are two large circles and one small inner circle. The outer large circle referred to by the fixed pointer, represents 10,000 gallons for each revolution, it is divided into 100 equal parts of 100 gallons each, the inner large circle, referred to by the movable hand, represents 1,000,000 gallons for each revolution, it is divided into 100 equal parts of 10,000 gallons each. The small inner circle represents 10,000,000 gallons for each revolution, it is divided into 10 parts of 1,000,000 gallons each.

In the above figure the hand in the small circle has not arrived at I, so that the inner large circle of figures only is taken. In this figure the hand is pointing to 25, and reads 250,000 gallons, the fixed pointer indicates 2,500, so that the meter reading is 252,500 gallons,

Fig. 4.

J. TYLOR & SON**Patent Rotary Water Meter.**

Reads 182,490 gals.

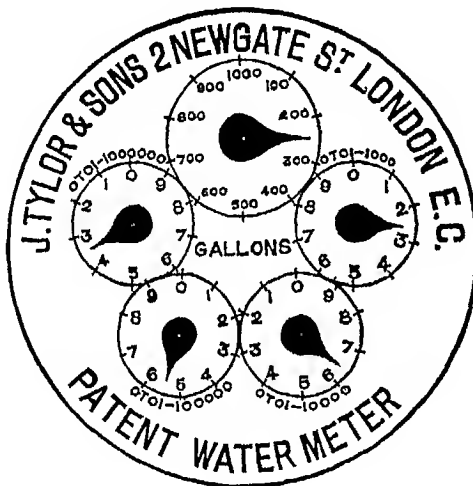
**Instructions for reading the dial****Registering in gallons**

The dial of this meter has five hands or pointers. The five hands register respectively 10, 100, 1,000, 10,000, & 100,000. In order to estimate the quantity of water which has passed through the meter, it is only necessary to add together the quantity registered by the various hands of the dial, care being taken only to count the completed divisions.

In the above figure the meter reading is 182,490 gallons.

Fig. 5.**J. TYLOR & SON****Patent Rotary Water Meter**

Reads 35,62,250 Gals.

**Instructions for reading the dial****Registering in gallons**

The dial of this meter has five hands or pointers. The five hands register respectively 100, 1,000, 10,000, 100,000, and 1,000,000. In order to estimate quantity of water which has passed through the meter, it is only necessary to add together the quantity registered by the various hands of the dial, care being taken only to count the completed divisions

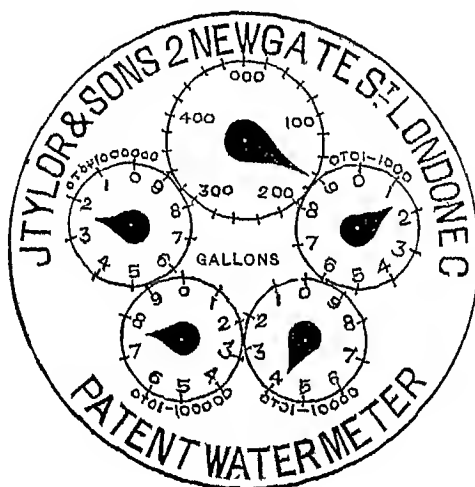
In the above figure the meter reading is 35,62,250 gallons

Fig. 6.

J. TYLOR & SON

Patent Rotary Water Meter.

Reads 27,41,160 Gals



Instructions for reading the dial

Registering in gallons

The dial of this meter has five hands or pointers. The five hands register respectively 20, 1,000, 10,000, 1,00,000, & 1,000,000. In order to estimate quantity of water which has passed through the meter, it is only necessary to add together the quantity registered by the various hands of the dial, care being taken only to count the completed divisions.

In the above figure the meter reading is 27,41,160 gallons

fittings. 19. Ball Taps 20 Supply cisterns 21 Flushing cisterns 22 Use of automatic flushing apparatus hoses, etc 23 Hot water systems 24. Warning pipes 25 Testing and Stamp- ing. 26 Method of laying consumer's pipes 27 Premises not to be supplied through more than one supply pipe 28 Separate supply pipe to every dwelling house 29 Position of stop-cock 30 Taps for drinking water 31 Consumer's outside taps or stand pipes 32 Pumps drawing water direct from water supply pipe 33 Prohibited connections of consumer's pipes 34 Work to be in proper order and tested before supply is turned on 35 Meters and meter rents 36. Engineer's decision final

(iii) The third part of the Hand-book contains rules for and observance by plumbers, and these are intended to protect applicants for water-supply against defaults by plumbers who, as we observed, are licensed by the President. We notice from the rules that services to houses and buildings are divided into two classes and defined as follows —

(a) A first-class service for which the consumer will be required to hire water meters from the Corporation, to adopt only specified fittings, and to secure approval of position and numbers of pipes and fittings

(b) A second-class service in which the consumer will be allowed to fix one tap of approved pattern provided it is placed in such a position approved by the President that it is visible from the road, and can at all times be readily inspected by the Municipal staff. No supply pipe for a second class service shall be of a larger bore than $\frac{1}{2}$ inch except with the written consent of the President

In addition to the cost of connecting, which includes labour, materials, supervision, etc, the Corporation levies the following connecting and testing fees —

	Rs	A	P
Connecting fee for 1st Class Service	5	0	0
Do 2nd	2	8	0
Testing fee 1st	2	8	0
Do 2nd	1	4	0
Fee for re-test	1	2	0

THE very recently galvanised pipes have been almost universally used for house connections. These have been found unsatisfactory as they are liable to rapid corrosion and tend to cause waste of water. Mr. Madeley recommends the use of lead pipes (Rule 11) as a result, no doubt, of numerous tests and experiments. As alternatives, if wrought iron, steel, or cast iron pipes are to be used, they are to be suitably treated before being laid. The following extract from the hand-book describes how the protection should be carried out — Wrought iron, cast iron and steel pipes must be protected on the inside from corrosion, either by galvanising or coating with a suitable material satisfactory to the Engineer. Wrought iron and steel pipes or tubes whether galvanised or not shall not be laid in earth unless coated and protected by one of the following methods

(a) The pipes shall be tightly wrapped with stout tape of approved quality, samples of which may be seen at the Corporation Stores. Before applying, the tape must be dipped in and thoroughly coated with petroleum pitch or siderosthen paint or other approved coating. After wrapping, the interstices of the material shall be filled up with a final coating of the preservatives which may be painted on with a brush. The coating to be applied to the pipe shall be the same as for the tape.

(b) The pipes shall be laid in a trough made of teakwood and filled with pitch. Cradles must be fixed in the trough not exceeding 6 feet apart in order that the pitch may entirely surround the pipe, and to prevent the pipe from rising or sinking through the pitch, the minimum thickness of pitch at any point round the pipe being five-eighths of an inch.

When long lengths of piping are required, the protection must be applied previous to laying. Overseers and plumbers who desire to keep a stock of house service pipes must have the pipes properly treated before use.

If, however, only a short connection is required, for which short pieces of piping or specials alone can be used, the protective coating may be applied in the trench when the pipes have been jointed up.

Under no circumstances must any gaps be left in the protective covering of house service pipes laid in earth. No pipes must be

covered up until the protective coating has been inspected and approved by the Engineer. Lead pipes in earth need not be protected according to the above rules.

The following extract regarding meter rents and meter testing will be found useful —

The President may fix meters on house services irrespective of the class of service.

In the case of metered services, the following rents for meters will be charged —

	Rs	A	P	
$\frac{1}{4}$ in	1	0	0	per mensem
$\frac{3}{4}$ in	1	4	0	"
1 in	1	8	0	"
$1\frac{1}{4}$ to $1\frac{1}{2}$ in	2	0	0	"
2 in	2	8	0	"
3 in	3	0	0	"
4 in	4	0	0	"
5 in and above	5	0	0	"

For domestic purposes, a free monthly allowance is granted equal to 160 gallons per rupee of the monthly rental value as assessed by the Revenue Officer. All excess will be charged for at As 12 per 1,000 gallons.

Complaints of incorrect or excess readings or as regards meter being out of order shall be made by the person concerned within six weeks of date of the reading which is disputed. In the absence of any such complaint within the above specified period, the reading of the meter shall stand and charges made accordingly. Complaints made within the specified period will be enquired into, provided the complainant deposits Rs 5 in case of first-class service and Rs 2 8 in the case of a second class service. This deposit will be forfeited if the meter is found correct, or returned if the meter is incorrect. An error of 5 per cent. either way will be allowed.

The hand-book is, so far as we can see, informing and complete, and should prove very useful to other Municipal Councils who contemplate framing Water Works by-laws. There should be no difficulty in getting a copy of the hand-book from the President or the Special Engineer of the Corporation, and we strongly recommend the hand-book to all municipalities.

Wood-paving in Calcutta.

THE following opinion has been expressed by Mr R S Pearson, Forest Economist, on the relative merits of hard and soft woods for street paving —

Generally speaking Conifer woods, that is Pine and Firs, season much quicker than hard-woods, such as Sal, Teak, Jamah, etc, they also settle down to a normal size quicker than the hard woods. Thus for instance Sal, which takes years to season, goes on absorbing moisture and partially drying out again for years, and in doing so is liable to contract and again expand nearly indefinitely, though year by year the expansion and contraction gradually decreases. Conifers on the other hand settle down to normal conditions quicker and though they still have a slight tendency that way, it is not so marked. Even Teak is not an exception, as I had some years ago an enquiry on the subject from Home in connection with paving blocks. I was recently on leave in England and made careful enquiries about paving blocks, with a view to collecting information in this respect for Indian timbers. As you know the tendency now at Home is to replace the hard woods by Conifer timbers for paving blocks. The reason for this is that the Conifers though softer and wearing more than hard-woods, wear much more evenly, and are not so liable to form small depressions, the expansion question at Home not being nearly so serious a one as out here, no very reliable evidence was forthcoming.

Based on the knowledge we have out here of the behaviour of hard-woods and Conifers as regards expansion and contraction, I am certain that the latter will give far better results than the former, though in laying Conifer blocks, it must be remembered that though they settle down more quickly to normal conditions, their initial expansion and contraction in the first year or two is quite as much as that of broad leafed hard-woods.



Government Orders & Notifications.

Madras.

AID TO THE TANJORE DISTRICT BOARD —In the distribution of the subsidy for 1916-17 intended to supplement the resources of the district boards sanctioned in G O No 1744 L, dated 27th November, 1915, a sum of Rs 84,901 was allotted to the Tanjore District Board. A further grant of Rs 28,800 representing one-fourth of the portion of land-cess set apart by that District Board for railway purposes during 1914-15 will now be sanctioned in aid of the general finances of the Board —[G O No, 27 L, dated 17-1-16]

TALUK BOARD ELECTIONS —All Collectors are requested to instruct Revenue Divisional officers to make as much use as they find possible of the services of non-official presidents of taluk boards and chairmen of union panchayats when advertising and holding elections for the membership of taluk boards [G O No 59 L, dated 17-1-16]

[Bombay]

Elected Presidents of City Municipalities

At a meeting of the Legislative Council held on the 18th July, 1915, the Hon'ble Mr V J Patel moved a resolution recommending that Government should issue an order under section 23 (2) (c) of the Bombay District Municipal Act, 1901, that every city municipality in the presidency shall have an elected president. The resolution was carried at the Council meeting in the following modified form —

“This Council recommends that the Governor in Council may, under sub-section 2 (c) of section 23 of the Bombay District Municipal Act, 1901, be pleased to consider the desirability of directing that every president of a city municipality in the presidency shall be elected by such municipality ”

2 Government have considered this proposal carefully. There are 23 city municipalities in the presidency, namely —

Northern Division —Ahmedabad, Surat, Broach, Nadiad, Bandra ;

Central Division—Poona, Ahmednagar, Nasik, Jalgoan, Dhulia, Sholapur, Baisi, Yeola,

Southern Division—Belgaum, Bijapur, Bagalkot, Dhawar, Hubli, Gadag-Bettigeri,

Sind—Karachi, Hyderabad, Shikarpur, Sukkur. The Poona City Municipality has enjoyed the privilege of electing its president since the year 1885. Orders have already been issued under section 23 (2) (c) of the District Municipal Act that in future the president of any municipality for which a municipal Commissioner has been appointed shall be elected by such municipality. Accordingly the municipalities of Ahmedabad and Surat will, in future, elect their presidents. The Governor in Council is now pleased to direct under section 23 (2) c of the Act that the municipalities of Broach, Nadiad, Ahmednagar, Nasik, Dhulia, Sholapur, Belgaum, Bijapur, Dhawar, Hubli and Gadag-Bettigeri shall in future elect their presidents, and that the arrangement shall come into force when the offices next fall vacant. The question of granting the privilege to the Bandia Municipality will be considered at a later date, when the town planning schemes in and about Bandia, which are now under consideration, have been fully launched. Government are of opinion that in the case of Jalgoan, which is still in the early stages of its development, and in the case of the municipalities of Baisi, Yeola and Bagalkot, which are comparatively small and far from the district head-quarters, the existing arrangements should, for the present, be maintained.

3 The Commissioner in Sind, to whom powers under section 23 of the Bombay District Municipal Act, 1901, have been delegated, should decide, after taking into consideration the orders which have now been passed, whether the presidents of the city municipalities in Sind are to be elected, or appointed by him whether in accordance with the vote of two-thirds majority of the councillors or without this preliminary step, or *ex officio* [Govt Res No 442 dated 19-1-16.]

Notified Areas in Salsette

The following Press Note No 846, dated the 4th February, 1916, is published for general information —

At a meeting of the Legislative Council held on the 13th July, 1915, the Hon'ble Mr V J Patel moved a resolution which was carried in the following modified form —

“This Council recommends to the Governor in Council to consider the desirability of constituting municipal districts out of such adjacent notified areas in the Salsette taluka as the Governor in Council thinks fit or, in the alternative, to appoint a substantial proportion of a notified area committee in the Salsette taluka on the recommendation of electorates to be constituted in such notified area”

2 The Governor in Council has considered the proposals carefully. It has already been announced that it is proposed to constitute the notified area of Ghatkopar-Kno! a municipal district. As regards the notified areas of Andheri, Santa Cruz, Vile Parle, Malad and Borivli, Government are of opinion that the time is not ripe for their conversion into municipalities either singly or in combination. They think it desirable, however, to enlarge the committees for these areas and to introduce an elective element in their constitution. Each of these committees at present consists of three members, namely, two officials and one non-official appointed by Government. The Governor in Council has decided that in future the number should be increased to five, of whom three should be officials and the remainder non-officials, appointed in accordance with the popular wishes as ascertained by a system of election which should be of a simple and informal character. Under the existing rules the committees cannot be reconstituted at once on this new basis. For the present, therefore, one of the two additional seats on each committee will be filled by the nomination of an official member and the other by election. Subsequently, when the office of the existing non-official member falls vacant, the vacancy will be filled by election.

[Mysore]

Extension of villages

Government direct that all references to Sanitary Officers in the matter of selection of sites for houses exceeding 50 should be made by an officer not lower in rank than an Assistant Commissioner in charge of a Taluk or Sub-Division. The Sanitary Officer should be consulted after the extension or removal of the village is finally decided upon and before proceedings are taken for the acquisition of the site [G. O. No 4506-15-San 35-15-2, dated 22-12-15]

Legislative Intelligence.

[Assam]

The Assam Local Self-Government (Amendment Bill), 1916, which it is proposed to introduce is published in the Assam Government Gazette

Sanction has, in certain cases, been given by the Local Government to the construction of private tramways on public roads. Such tramways are of advantage to commercial companies whose places of business are connected with the railway by unmetalled roads, as ensuring the carriage of goods to and from the railway throughout the year and to the Local Board concerned as removing heavy carting traffic from the road and thus reducing maintenance charges. But as it appears that the provisions of the Indian Tramways Act, 1886, do not apply to private tramways and that sanction to the construction of such tramways cannot be granted by Government unless authorised by an Act of the Legislature, the present Bill is designed to empower the Chief Commissioner to sanction the construction, or, where they have already been constructed, the maintenance, of such tramways on public road, providing at the same time for the protection of the interests of the public.

Power is reserved to the Chief Commissioner to prescribe the condition subject to which such tramways may be constructed or maintained.

[Bengal]

MALARIA IN THE MURSHIDABAD DISTRICT—The Hon'ble Maharajah Ranjit Sinha asked whether the average death-rate exceeded the birth-rate in the Murshidabad Municipality during the last two years and what steps Government were taking to improve the health of the people in the Murshidabad District?

Government replied as follows —

In common with the great majority of Bengal Municipalities the recorded death-rate in Murshidabad exceeds the recorded birth-rate, but it is not possible to say whether the death-rate really does or does not exceed the birth-rate. The disinclination of parents to register births is often very great. Investigation has sometimes shown a deficiency of 50 *per cent* in recorded births, and it is therefore extremely difficult to draw accurate conclusions from the figures which are supplied.

A grant of Rs 40,000 was made to the Berhampore Municipality for water-supply during the year 1914-15 and a grant of Rs 500 for quinine during the current year. Eighteen vaccinators were deputed on special duty in connection with small-pox during the rains of 1915. The District Board of Berhampore spent Rs 16,421 on medical charges in 1914-15.

[Bihar and Orissa]

The following Resolution moved by the Hon'ble the Rev Dr Campbell was accepted by Government and carried unanimously —That this Council commends to the Lieutenant-Governor in Council that an enquiry be made into the question of the Housing of casual labour on the coal-fields of the province, with special reference to the subject as it affects the amenities of civilised life.

[United Provinces]

The Hon'ble Sanjīd al-Nabī, Khan Bahadur asked if the Government would postpone the consideration of the Municipalities Bill till after the war.

The Hon'ble Mr Pim Replied —The Lieutenant-Governor has carefully considered the point in view of the arguments for postponement which were at one period pressed upon him. Having regard, however, to the alterations in the Bill which have been effected in Select Committee, he has decided to allow the legislation to take its ordinary course and not to defer an advance in Local Self-Government which appears to meet with general approbation.

Recent Publications.

THE CHARM OF BOMBAY. An anthology of writings in praise of the First City in India. Edited with Notes. By R P Karkaria. Bombay. Talapooievala.

HOUSE, TRUCK AND TRACTOR. THE COMING OF CHEAPER POWER FOR CITY AND FARM. By Herbert, N Casson, R W Hutchinson (Jr) and L W Ellis, Chicago, F G Browne & Co. Price \$1.

BRIDGE FOUNDATIONS. By W Burnside, Assoc M Inst C E. Price 4s net.

THE REINFORCED CONCRETE REGULATIONS of the London County Council. By E S Andrews. Price 2s 6d net.

The Local Self-Government Gazette.

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Town-Planning Lectures.

WE have no doubt that many of our readers have followed with interest the series of lectures delivered by Mr H V Lanchester, the town-planning expert, in Madras. One of these—on “Indian and European Cities”—was reproduced in our last issue. We propose, in this article, to refer briefly and in a general way, to the scheme of the lectures, emphasising the lessons which are of practical value, at the present juncture, to those entrusted with the administration of Municipal Councils and Local Boards. As these lessons are bound to be more impressive when conveyed in Mr Lanchester’s own words, we feel that no apology is needed for the length and frequency of the quotations.

The introductory lecture—the Ethics of Town-planning—naturally dwelt upon the human element underlying all Town-planning problems. Voluntary local effort is at the root of town improvement. “No more can you perfect a city by Town-planning Acts or Municipal By-laws. A city can only become beautiful, convenient and clean by the united efforts of its inhabitants. Without this spirit, rules and regulations can only mitigate the worse evils, determining what must not be done, rather than indicating what might be done. The standard is bound to be near the lower end of the scale instead of near the higher.” How then are we to evoke this concerted effort? Let us answer in the words of Mr Lanchester.

“The initiative in regard to these facts and requirements rests with the people, their leaders must endeavour to bring out all the

latent aspirations towards a fuller life that they possess and then call in the town planner to give material form to the demands this life will make. In considering the methods by which this can best be done, we may take as types of organization the army or the school—each at their best—with the assumption that advancement and authority are the rewards of probity and ability so that each small group has its leader, in turn forms one of a group of his own grade under a head—Citizen private, Lieutenant, Captain, etc. The gap between the private citizen and the Municipal Council is too great and the usual sub division of the city too arbitrary. Something much more intimate is needed to get the best service out of every one, some smaller area in which to take a special interest, some volunteer leader to direct and advise in regard to this area.”

We shall leave our readers to ponder over these most pregnant words—true not alone in Town-planning but in all spheres of local activity as well, comment will only weaken their effect.

The second and third lectures were technical—devoted to the programme of a Civic Survey, the scope of the preparatory studies and of the plans which should be made before a regular study of the development of a city can be undertaken. The need for orderly development of cities on a carefully determined plan is thus explained.

“It may be thought that the same policy of *laissez faire* is the right one to apply to new or rapidly developing towns, lest any interference might result in arbitrarily restricting commercial activities. The only justification for this view would be the incompetence of the controlling body.

The science of city planning has, however, now reached a stage that should disarm any distrust as to the possibility of forecasting on general lines the best form of development in any particular case. It need not be inferred from this statement that there will be no mistakes in detail or that the men selected will always prove competent to their task, but it may be accepted that if the right type of body is charged with the determination of the structural lines of a new or developing city, the result arrived at will be immeasurably superior, from both the economic and social points of view, to the usual haphazard results of a *laissez faire* policy.”

In the fourth lecture, it was pointed out how a city cannot be developed on the right lines unless its traditions are carefully studied—"the traditions in regard to building, the traditions of business, of employment, of worship, education, and recreation, all demanding appropriate expression in buildings and their environment."

By far the most interesting of the lectures is the sixth—on city life and housing. The standard of life in the home is bound to react on the city and all improvement must begin with the family. In this respect, the policy should be not merely to maintain the existing level but to educate the citizens to higher views of life.

"In the provision of homes, the first consideration must be the character of those to be accommodated and their legitimate demands in the way both of individual and communal accommodation. We must, however, go further than this, not merely giving what they at present demand, but studying to realise and provide what they ought to demand raising, by means of a wise provision, the standard of practical efficiency and artistic taste, not to speak of the standard of wealth and general well-being.

To succeed in this, and to develop the capacity of the citizen, may be regarded as the main object of civic improvement, for naturally the city is for the citizen, not the citizen for the city, and it therefore follows that once a city has justified its economic existence, the study to be next pursued is that aimed at fostering the best type of citizen."

Now, overcrowding and congestion are problems to be faced in India as elsewhere. Economic causes are at the root of these evils in other countries, in India, we have, superadded to these factors, social causes of great importance—such as, the concentration of occupational groups, the laws of division of property. The result is a low type of building, minute sub-division of houses and other features of town life so familiar to us in every city. Most of our towns have then to face this problem, and naturally a question of very great importance arises—on what lines should it be attacked?

Again, we give below Mr Lanchester's views for the consideration of our Municipal Councils

"Restrictions as to the number permitted to occupy premises of a certain capacity are easily drawn up but very difficult to enforce. The same may be said of by-laws restricting the amount of building on a given area, though with these the enforcement is somewhat less difficult

I am inclined to put more faith in the policy of providing a counter-attraction in the way of pleasantly arranged building areas with every possible convenience of access as near as possible to the congested districts—added to this you will require skilfully organised adjustments so that the various castes or trades shall not be violently uprooted, but rather offered some special inducement to remove such as increased open space, or improved facilities in some form or other. Even then the problem is a difficult one but there are signs of an increasing appreciation of the advantages of this type of solution and the more frequently it succeeds the less will be the resistance that is met with in the future"

We hope we shall not be considered as laying undue stress on this part of the subject. We consider that its importance cannot be exaggerated. Not very long ago, the Local Government gave liberal grants for the relief of congestion. Most of our readers know how the grants were utilised in some towns. Overcrowded areas were selected, and the houses in them were acquired and pulled down. The people evicted from their houses were not re-housed on any system, they were allowed to spread to other parts of the town as they liked. The result was obvious—the measures adopted for the relief of congestion too often resulted in increased congestion! We hope, therefore, that the following words of Mr Lanchester, laying down the right policy which should be kept in view when schemes for the relief of congestion are worked out, will command the attention they so richly deserve

"The tendency towards overcrowding is here more difficult to combat than in Europe, and it is for this reason alone more urgent

that the authorities should not only make it possible for those dispossessed to find other homes, but should organize the removals and provide every facility in their power. Sometimes, I am given to understand, the payment of a proper monetary compensation has been regarded as discharging this duty, with the result that those householders deeply in debt, and many I believe are in this unfortunate position, have been compelled to use this money to discharge their debts and find themselves with no longer a home and no means to provide a new one. Overcrowding thus becomes inevitable.

It is clear that if there is any risk of this, municipalities must do more towards arranging for re-housing of those turned out than has hitherto been customary, though in all fairness I must admit that the attempt has frequently been made.

I have been asked by one of you to explain what in my view is the best course for a municipality to take when expropriating householders under a clearance scheme. There are several alternatives. The immediate payment of cash compensation is, for reasons I have stated, often unwise. The provision of fresh sites and erection of new houses is rather a costly method, if the new houses are, as they should be, much superior to those removed. In Europe where the poorer classes usually rent their houses, it is possible to put up sanitary premises to be let at a suitable rent, but it is better that even the poor should own their houses when it is possible. Perhaps the best method is for the municipality to provide a new site, to allow so much of the old buildings as may be portable to be transferred and re-used and then to pay out the amount allowed as compensation in instalments as the new house is erected. If the householder desires (and in this he should be encouraged) to build a better house, the municipality can lend a further sum taking a mortgage on the house, this sum to be repayable by the householder in monthly instalments proportioned to the sum so advanced. In all cases the house to be built should be approved by the municipality both as being good in itself and suited to the position of the owner.

This last course is, I consider, the one usually most likely to ensure the success of rehousing schemes where those to be re-located are possessed of but small means. Where they are comparatively well to do, the problem is a simpler one, but it might still be as well

to take such steps as will ensure the compensation laid being devoted to its housing in an adequate manner "

We cannot deal with all the other points of interest touched upon by Mr Lanchester, within the compass of this short article. We would conclude by drawing attention to Mr Lanchester's observations on the uses of a Town-planning Act for us here. We have some initial advantages, land is comparatively cheap and plentiful and speculation in building-sites is not so rampant as in European cities. Again, the close relationship between the city and agriculture, though it has its disadvantages, has its advantages also, sometimes defining building areas in a beneficial way. Lastly, we are accustomed to and welcome the initiative of Government or Municipality. A Town-planning Act conceived and worked on right lines has thus a great future and it is hoped that we shall soon have an Act, and, what is more important, that its provisions will be worked with foresight and sympathy.

Public Health Lectures.

The Water We Drink *

[BY CAPTAIN A J H RUSSELL, M A , M D , CH B , D T M ,
I M S , PROFESSOR OF HYGIENE, MEDICAL COLLEGE, MADRAS]

THE subject of this lecture may appear at first sight too simple for serious attention, but a little consideration may possibly show the water we drink under other aspects than that of a thirst-quencher.

When water is quite pure, it has neither taste nor smell, but it is never found quite pure in nature. The reason for this is that there are few things which water does not dissolve to some extent, both solids and gases being almost always found in solution. When we talk of pure water, therefore, we do not mean chemical purity, which can only be obtained with difficulty, but water which for all practical purposes is free from matters injurious to health.

* Being the fourth of the Series of Public Health Lectures delivered at Madras

Water is to all living things a very precious fluid, in fact the most precious fluid there is. Without plenty of it our lives could not be healthy, and, in fact, could not continue for any length of time. In the tropics a man would probably not live more than 48 hours if he were totally deprived of water. In India, between 35 and 40 out of every thousand of the population die every year, as compared with 15 to 18 per thousand in Great Britain. A certain proportion of the deaths in India is certainly due to the more severe climate, but by far the greater part is due to unhealthy and dirty surroundings and insanitation generally, and probably not less than 30%, or five deaths per thousand per annum, are caused by the use of impure water. In other words, something like fourteen lakhs of people die every year in India because they drink dirty or impure water. The importance of having an abundant and good supply is therefore obvious.

During the last two years or so, we have come to regard with grave suspicion anything, be it promises, or Zeppelins, or "Emdens", that comes from Germany, but even these should be subject to less doubt and suspicion than the water supplies of this country. Here, where the water for domestic purposes is stored in tanks, where the people wash soiled clothing by the side of these same tanks and allow the dirty washing water to flow back into them, in innocent disregard of all sanitary laws, where the people deposit stools, etc., on the surface of the ground without even the pretence of a pit or cesspool, where the people drink the water in which they have just bathed, is it surprising that well-known water-borne diseases like cholera, dysentery, and enteric fever, are never absent?

The amount of water required daily varies greatly and depends chiefly on the habits of the people and the sanitary arrangements of the locality. In a village little is required for Municipal purposes, whilst in a city like Madras, large quantities are used in this way. The new water-works scheme in Madras allows of a daily supply of 25 gallons per head of the population. In this country, however, where the rainfall

occurs only in certain months of the year, and where occasionally the monsoons fail, it may be impossible to supply even half this quantity. It is therefore the duty of everyone to see that there is no waste of water. It is unfortunately too common to see public taps left running for hours at a time, hundreds of gallons of the precious liquid escaping into the side drains. This is due to thoughtlessness and carelessness, but waste of water is criminal, and the law should severely punish all guilty of this offence.

Let us consider what are the chief sources of water supply. In the first place we have rain which falls from the clouds. You know if you place a little water in a vessel exposed to the sun's rays, the water will dry up and disappear. It is really turned into vapour by the heat of the sun and passed into the air. The same thing takes place with the sea. In tropical parts of the world it has been estimated that as much as 700 gallons of water per minute are evaporated from each square mile of ocean surface, and this water passes into the air and forms clouds. These clouds are carried hither and thither by the winds, and when the temperature falls, the vapour again turns into water and falls as rain. It might very naturally be supposed that this rain water would be quite pure, coming as it does from the heavens, but, as it falls, the liquid brings down with it many substances present in the air, for example, soot, smoke and dust, and all the germs usually found in dust. You will readily understand that rain falling over the City of Madras will contain large quantities of these impurities, while in the country districts few of these impurities are present in the air. Rain water, nevertheless, is the purest and softest of all waters, and the only drawback to this supply is that it cannot be depended upon, especially in hot countries like India.

A common practice in Cochin, where good drinking water is scarce, is to collect rain water in chatties as it falls on the cocoanut palms.

Until a short time ago, Aden was totally dependent on rainfall for its water supply, the rain as it fell being carefully collected from prepared surfaces and stored in large underground tanks.

Rain water which has fallen in hilly districts where there is no cultivation and where few people live is known as "upland surface water." This is nearly as pure as rain water. There is no smoke, soot or dust anywhere near, and therefore few harmful germs. It is usually collected in tanks or lakes, the Ootacamund water supply being a good example of this variety.

The water collected in the tanks which are so commonly met with in the country lying round Madras is of a very different nature. Here the water is collected from the surface of the ground near villages and farms, ground which is not only cultivated, but on which may always be found large quantities of sewage, manure, urine, excreta, decayed animal and vegetable matter, and, in fact, all kinds of animal and human filth. The ordinary tank water contains in solution many of these substances, along with the germs which always accompany them, and is therefore one of the most impure of waters with little to be said in its favour.

Having once reached the surface of the earth, rain water gradually passes down through the ground to varying depths, and, to reach it, wells are sunk and the water brought to the surface in different ways. The science of Geology teaches us that the surface of the earth's crust is made up of various layers of soil, through only some of which water can pass. A layer through which water cannot pass, e.g., a layer of clay, is called an impervious layer. The surface soil allows water to pass through it, but the surface soil may be very shallow, and the depth of the soil through which well water passes is of the greatest importance.

All wells may be divided into two classes, first, shallow wells (those which get their water from the first layer of soil),

and secondly, deep wells, which pass through one or more impervious layers. The first impervious layer may either be close to the surface or it may be very deep, according to the locality, and, therefore, although it may appear a contradiction in terms, it may be that, measured by feet, a "shallow" well will be deeper than a "deep" well. The water drawn from shallow wells is simply surface water, much the same as that found in the ordinary tank, perhaps even more impure, as, in addition to the surface filth, it contains a large amount of matter which has soaked into the soil from all the drains, privies, cow-sheds, cesspits, etc., in the vicinity. The typical history of one of these shallow wells is as follows —

"A few houses are built and a well sunk to supply them with water, and this supply may be, and generally is, good to start with, but gradually the sewage from the houses round about the well sinks into the soil. At first the soil is able to remove the filth, but as more and more filth passes into the soil it loses its power of filtration, and the liquid sewage passes unchanged into the water from which the well draws its supply, and the well water becomes unfit for human use."

Deep wells, passing as they do through a layer of soil, which cuts off the filthy surface water, usually give a fairly abundant and good supply. The water, however, is often hard, by which is meant that it only with difficulty makes a lather with soap. In the opinion of sanitary authorities, every open well, however deep, which does not pass through at least one impervious layer, should be regarded with suspicion as a source of supply for the household. It is an unfortunate fact that the presence of sewage and such like impurities in water does not always make any difference to its cleanness and taste, and a water famous for its sparkling cleanness, beautifully cool and very palatable, may be found, on chemical analysis, to be little better than dilute sewage.

As proof of this, let me quote the famous example of the Broad Street pump in London, the water from which had a

great reputation as being cool and sparkling, whilst in fact it was grossly impure. An epidemic of cholera broke out in the neighbourhood of this well and was confined to those who drank its water, while 70 men employed in the same street who never drank its water, escaped cholera altogether. On the other hand, a woman who formerly lived at Broad Street but who had not been there for many months, and lived in a district far removed, got cholera and died. On enquiry it was found that the lady liked the Broad Street water so much that she had a bottle filled from the pump and sent to her every day. A niece, who was on a visit to her, drank the water, and after returning to her residence in a healthy part of London, was attacked with cholera and also died.

In the Georgetown area of Madras City, there are over eight thousand shallow house wells, and from what has been said it is evident that none of them can give a supply of pure water. The average well indeed, in its usual condition, is a dangerous source of supply.

As the rainy season in this Presidency extends only from October to January, most of the rivers are dry for the greater part of the year, and if these were to be used as sources of water supply, it would be necessary to construct collecting tanks or reservoirs by building dams across their beds at suitable spots. The supply for Madras City is obtained in this way from the water of the Cooultier river and its tributaries. An anicut built across the river at Tamarapakkam diverts the water into a channel which runs into the Cholavaram and Red Hills storage tanks, and from these tanks a constant supply is brought into the city by means of an underground conduit. The catchment area for this supply, that is, the area from which the water is collected, extends to as much as nine hundred and seventy-seven square miles. In this large area there stand many villages, in which live many hundreds of men, women and children. A large quantity of the sewage and filth produced by these people must ultimately reach the Red Hills Tank.

Before we can thoroughly understand the methods by which a pure water supply may be obtained, it will be necessary to spend a short time in considering the various impurities found in water. These are usually described as mineral or inorganic, and organic, the mineral being for the most part dissolved in the water, or "in solution," and comparatively harmless, whilst the organic remain "in suspension." These organic impurities include sputum, vomit, fæces, urine, hair, pus, particles of skin, eggs and embryos of intestinal worms, dead leaves, fibres of cotton and other vegetables, small plants like mosses, and last, and most important of all, the numerous bacteria or microbes.

It will be evident that the impurities present in any supply will vary immensely according to its source, and the nature of the soil through which the water has passed. For instance, if it passes through limestone it absorbs lime and becomes very hard, like the water at Coimbatore. Hard rocky soils do not dissolve easily, whilst soft clay and loam soils give up large quantities of suspended matters to water passing over or through them. Generally speaking, upland surface water, stored where it falls, contains few impurities of either kind, and the organic substances present, being almost wholly derived from decayed grass and leaves, may at the worst produce diarrhoea. On the other hand, ordinary surface water, such as is found in the common village tank or shallow house well, contains large quantities of different mineral salts, many of them being directly derived from urine and fæces of animals and man. Bacteriological examination will also demonstrate the presence of immense numbers of germs. One germ, known as the *Bacillus Coli*, is always present in Indian waters, and as this germ is always found in the intestines of man, its presence in water is direct evidence of pollution with fæces. Along with the *Bacillus Coli* are very frequently found such germs as the *Bacillus* of dysentery, the *Bacillus* of enteric fever and the *Bacillus* of cholera. These three diseases are

all intestinal in nature, and millions of the germs pass out of the patient's body with every stool. From the stool to the water supply is a short journey for the germ to make, carried as it is in so many different ways. The practice of washing clothes, perhaps soiled with cholera or typhoid stools, in the vicinity of a well or at the edge of a tank, is so universal in this country that the sight probably leaves no impression on the mind of the average passer-by, but the man who has studied sanitation knows that epidemics of disease are sure to follow this practice.

Further, the practice of drawing water from wells with a brass vessel which has been scrubbed with earth from a dirty pond or sand from the road side is a most dangerous one. The earth and sand probably contain not only the dust of human stools and the remains of dried urine and expectorations, but, in addition, contain the germs of diseases spread by these substances.

Equally insanitary is the well rope used for lowering the vessels. It is usually allowed to lie on the ground—ground trodden by feet carrying unspeakable filth, and each time it is used it carries into the well particles of this material and countless numbers of the germs which live in it. The ordinary village well, as generally used, is an active agent in spreading disease throughout a community. For instance, a mother nursing her cholera-stricken son rushes to the common well with hands and *lota* soiled with the stools and vomit of the patient, ties the rope to her vessel, and, as she lowers it, there drops into the water particles of matter probably containing a sufficient number of germs to infect every household in the village. When the next housewife comes along, she uses the already infected rope, and carries away, not only on her hands but in her waterpot, many of the dangerous germs.

Again, if there be in the vicinity of the well, any collection of rubbish, or a heap of cowdung, or even, as so often is the case, a latrine which has no proper floor, the impurities

from these sources sooner or later pass into the ground or are washed in by rain, and flow down into the well from all sides

In similar fashion, tank water becomes contaminated. Clothes are washed in the tank, stools and urine are deposited either in the water or on its banks, whilst rain washes in large quantities of similar matters from the ground round about. The water round the edge is used for washing and for drinking, and therefore there is little doubt that the village tank is one of the chief causes of sickness amongst the people.

River water also may be polluted in various ways long before it reaches the collecting or storage tanks. If you remember what has already been said regarding the large area from which the Madras City water-supply is derived, this will be easily seen. The collecting area is too extensive to leave totally unpopulated, and there are, therefore, sources of contamination in the sewage of every village or house to be found therein. Indeed, villages situated on the sides of the collecting tanks have frequently suffered severely from cholera, and there can be little doubt that from time to time cholera germs from this source have been carried into Madras by the water from the Red Hills Tank. Villages on the banks of the Coimbatore river, also, are constantly discharging sewage into the river bed, making the water more impure and adding to the burden of the Municipal Engineering and Health authorities. All over India, rivers are used for the washing of persons, clothes, and cattle, and for drinking, while the banks are invariably used as latrines and burning grounds for the dead. When the rivers run dry during the hot months, the river beds are also used for similar purposes. "The insolent defiling of the rivers by the human herds" who go there, makes river water a very dangerous source of supply. The open canal, which until very recently carried the water supply from the Red Hills to Madras, is a very good example of the manner in which impurities may be added to flowing water. It was no uncommon thing to see a man committing a nuisance on the bank of the canal and then washing himself in the water.

while a little further down the women were filling their pots with water containing no doubt particles of faecal matter, perhaps containing cholera germs, or a little spittle or a little urine. The epidemic of cholera in Hamburg in 1893 is a remarkable instance of how disease can be spread through the agency of water.

"Hamburg, Altona and Wandsbeck are three towns which adjoin each other and really form a single community, they do not differ except in so far as each has a separate and different kind of water-supply. Wandsbeck obtains filtered water from a lake, Hamburg until recently obtained its water in an unfiltered condition from the river Elbe just above the town, and Altona obtains filtered water from the Elbe below the town. Whereas Hamburg was visited with a severe epidemic of cholera, Wandsbeck and Altona, if one excepts the cases brought thither from Hamburg, were nearly quite free from the disease. On both sides of the boundary the conditions of soil, buildings, sewerage, population, everything of importance, were the same, and yet the cholera in Hamburg went right up to the boundary of Altona and there stopped." In this large population on each side of the boundary nearly all the factors were the same except the water-supply. The population supplied with the unfiltered water from the Elbe suffered severely from cholera, while the population supplied with carefully filtered water from the same source escaped.

Wells, tanks and rivers, may also be polluted by means of dirty feet. Where the wells have no parapet or have steps leading to the water the person drawing water may unintentionally kick a certain amount of dirty mud into the well, while people who have been walking along dirty roads will certainly carry into the water of the tank or river all kinds of filth and germs on their skin.

Now let me just mention that the pollution of water is forbidden by your own religious teachers. Manu prohibits the committal of nuisances in water and on river banks, and

has ordained that urine and fæces, spittle, or clothing infected with fæcal matter or blood, or poison, should not be thrown into water. By grouping poisons and the other impurities together, he seems to have been fully alive to the dangers of the latter. Valmiki says there is no higher sin than that of polluting drinking water, while Vishnu laid down the punishment for this offence as a fine of 100 panams, and the removal of filth by the offender himself. This is indeed making the punishment fit the crime, and might with benefit be adopted in the city in which we live. The views of your own ancient teachers are, therefore, in complete accordance with the modern views of Hygiene and Sanitation, and it is surprising that so little attention is paid by the orthodox to those excellent injunctions.

Even where there is a system of distribution pipes, if the supply of water is not constant it may be necessary to store it for drinking purposes, but the method of doing so seldom receives that attention it deserves. The water is often contained in wooden tubs, chatties, etc., without covers, thus exposing the surface to the dust and germs constantly present in the air. The receptacles themselves are kept on open verandahs, on the kitchen floor, or in some equally unsavoury and insanitary spot, where dust and dirt and "poochies" of all kinds abound.

Where water is distributed by hand, either by means of water carts, barrels, chatties or skins, another danger of contamination is to be met with. The water carriers, as a rule, have no idea of the cleanliness required. A waterman may be assisting to nurse a son suffering from dysentery, but that does not prevent him from using his hands to guide the flow of water from barrel to chattie. Their vessels are always contaminated also, by coming in contact with dirty skin and clothes, or the filth sodden ground, and they play the part of constant carriers and distributors of all kinds of disease.

Having now learned something of the sources of pure water, and something of the impurities met with in water supplies, our object must be either to obtain the pure water and maintain its purity, or to remove, if possible, any impurities present

Purification
Pure water is naturally to be preferred to purified water, of that there can be no shadow of doubt, but, as the former can hardly ever be obtained, we must be content with the latter. As the vast majority of towns and villages in India are still dependent for their water-supply on wells, it will be of advantage to consider, in the first place, what means are necessary to ensure the well giving pure water. One authority has laid down the following requirements —

- (1) The well should be sunk in a clean soil
- (2) It should be provided with a parapet wall and lined with some impervious material for at least 10-15 feet, and, if possible, as far as the impervious layer of soil, and the water should come only from the bottom
- (3) It should be provided with a pump or a bucket and rope, and no other vessel should be permitted
- (4) A pucca stone platform should be laid all round to a distance of 10-15 feet, sloping away from the well, and an impervious drain should be provided at the edge of this platform to carry off all spilled water. No washing of clothes should be permitted there
- (5) It should be a considerable distance from any cess-pit, latrine, or sewage drain, and at least 250 feet from any human habitation

Perhaps it is hardly surprising that, if these are the conditions required to ensure that well water is kept pure, so many people in India die from the drinking of impure water. No soil can be clean if it is constantly soaked in sewage for the removal of which no drains exist, and in very few Indian houses is there any attempt to carry off sewage and washing water. The stone lining prevents the urine and the filth

from draining into the well as soon as it passes under the surface of the ground, whilst the platform and drain not only prevent that soakage of the ground round the well which is such a common feature, but also keep vessels and rope free from the filth with which they are usually covered. The well must not only be away from the vicinity of cesspits, drains and houses, but it would be against all sanitary principles to sink a well through a cultivated soil to which year by year manure, whether animal or vegetable, was being added.

Individual efforts must end in failure, for, where there is a common well or tank, one person who refuses to carry out these sanitary measures will spoil the efforts of all the others. Laws and regulations therefore are necessary, and these should be framed with a view to compel the general mass of the people to obey sanitary requirements. This will only be possible where the "sanitary conscience" is awakened, and the education of the masses in respect of the advantages of improved methods of dealing with refuse, better and cleaner conditions in the home and its surroundings, must go hand in hand with the efforts of the trained sanitarian. Without this nothing will be gained, and only imitation and fiction will result.

Where disease has broken out, and especially during epidemics of cholera, much good has resulted from the treatment of wells with Potassium Permanganate, a solution of which, known as Condry's Fluid, is perhaps more familiar. This method of purification is called "Hankinising" a well, a Dr Hankin having been the first to introduce it. The Potassium Permanganate should be added in quantity sufficient to maintain a faint pink colour in the water of the well for at least 24 hours. Should the colour disappear in less than 24 hours, this is a proof that the impurities have not been completely removed, and more permanganate should be added. This substance acts on the poisonous polluting matter in the water, and, in addition, helps to kill off the dangerous germs which cause disease.

This method, however, is an example of locking the stable after the horse is stolen, and the best way to prevent pollution of a well is to provide it with a pump and a tightly-d cement cover. A properly-constructed well, fitted in way, will ensure a protected water-supply. In spite of alai opinion to the contrary, water in a covered well does become bad. In India, covered wells are practically unwn, although there are now a considerable number to be met a in Tondiarpet and the districts lying round that part of las City. A certain amount of objection was raised when y were first introduced, but their value has been proved, as, addition to giving a pure water, they prevent the breeding mosquitoes. Nearly every well in Madras City has been id at one time or another to be the breeding place of large ibers of malarial mosquitoes, and, were all wells to be icted in this way, from the malarial point of view alone, sense benefit would result.

Over a score of towns in Madras Presidency have the antage of a protected water-supply, distribution of the water ig effected by pipes with taps fixed in each street or house. ust not be supposed, however, that as soon as such a sys- is introduced the health of the town will show any sudden ovement. The improvement is very gradual indeed, ng to the prejudices of the people against using water which es through pipes and which can be drawn at public taps a to all castes. The impurities, both chemical and emiological, which may gain an entrance to the water in collecting area, must be removed before the supply can be ounced safe. By allowing the water to pass slowly ough layers of sand, most of the suspended particles of clay, a, etc., and most of the germs, are kept back. In Madras ies of fourteen filter beds, as the sand layers are called, been constructed, and the water brought from the Red ls passes through one or other of these filters before it hes the distribution pipes in the city. Only a pure clear

free from germs. By means of these sand filters, large quantities of water can be purified, but, in the absence of any such scheme, small domestic filters may be used in the house, the best patterns being those known as the "Beckfeldt" and the "Pasteur-Chamberland" filters. The filtering parts of these machines are called "candles" or "bougies", and are hollow cylinders made of a peculiar kind of clay, through which water can pass freely, but through which bacteria are supposed to be unable to go. We say "supposed", because, however efficiently these filters, when new, keep back bacteria, if the candles are not cleaned and boiled every two or three days, the germs gradually grow through the interstices, and experience shows that many a household filter, far from being an agent for removing germs, is in reality a machine for making a "bacterial *kunjee*" of the water which passes through. Instead of being a means of preventing disease, it acts in quite the opposite direction. The common idea of the action of a filter is that the water to be purified merely has to run through it automatically in order to be rid of all the suspended foreign matters and such organic impurities as it contains, and that this action will go on for ever and a day. Never was a more dangerous idea conceived.

Even when water is supplied by pipes and is passed through filters, it may, and frequently does, become contaminated unless every precaution is taken to protect it after it has been drawn. The barrel kept full under the tap, in which the sweeper washes his pans, the matey his towels, the garden-er his hands and feet, and the cook his pots, shows what actually takes place in many houses and how the advantages of a filtered supply are altogether lost.

Vessels for storing water inside the dwelling house should have tightly fitting covers, for the pollution it undergoes after being drawn causes much of the disease attributed to the water. Exposure to the sun's rays for an hour or two each day will kill all germs lurking in or on the water vessels, but it is difficult to persuade people who constantly shut out the sun's rays from

then houses that these rays are perhaps the most valuable disinfectant it is possible to obtain. The impurities present in tanks would be many times greater were it not that the exposure of the water to the sun's rays destroys much that is harmful in it.

Where the water-supply is not filtered, and where it is impossible to protect it from the dirty habits of one's neighbours, in fact, where there is any doubt regarding the purity of the supply, the boiling of all water to be used for human consumption is recommended. Boiling for a few minutes will kill all the disease-producing germs, and will also destroy the eggs of any parasites or worms which may be present. Boiled water is flat and not so pleasant to drink as fresh water, but this objection can be done away with if the boiled water is allowed to cool in a clean earthenware vessel. In such a vessel evaporation takes place through the pores, and sufficient oxygen is re-absorbed by the water to make it once more pleasant to the taste. Especially important is this precaution during the cholera season, when not only the wells but the vessels may contain all kinds of impurities in spite of supervision.

It may be thought by some of you that danger lurks everywhere and that it is almost impossible to find a water which may safely be used for drinking purposes. We may almost be inclined to exclaim with the poet "Water, water everywhere, and not a drop to drink". A pure water is difficult to find, but fortunately for many of us there are active agents in our own bodies ready to fight against the poisons introduced by impure water, and so long as we retain health, these can do battle for us. At the same time, the question of a pure water-supply is a matter that the people of India, of all people, should take an interest in, for the people of India are the greatest water drinkers in the world, and water may really be said to be the national beverage. If this lecture has given you a new interest in your national beverage, it has served the purpose for which it was prepared.

Ideals of Local Self-Government ; Town Planning and Architecture in Ancient and Modern India.

II Town-planning and Civic Ideals in Kautilya's Artha Sastra

[B. K. S. RAMASWAMI SASTRI, B.A., B.L.]

I shall now take up the further discussion of the subject and describe how it is dealt with in the various *Niti Shastras*. Professor Benoy Kumar Saikar well says

“ Much of the prevalent notions regarding the alleged inferiority of the Hindu genius in grappling with the problems of this mundane sphere and the extra proneness of the Indian mind to metaphysical and unpractical speculations can vanish and be proved to be the results of mal-observation and non-observation leading ‘to half truths which are really whole errors’ only if we apply the Historico-Comparative method in studying facts and phenomena. The Hindu has no doubt always placed the transcendental in the foreground of his life’s scheme, but the positive background he has never forgotten or ignored. Rather it is in and through the positive, the secular, and the material that the transcendental, the spiritual, and the metaphysical have been allowed to display themselves in Indian culture history. The Hindu has never been a ‘corner of the ground’ but always ‘true to the kindred points of heaven and home,’ has been solicitous to enjoy the good things of this earthly earth and beautify this ‘orb of green’. The literature, fine arts, religious consciousness, industrial life, political organisation, educational system, social economy, etc., of the Hindus—all have sought to realize this synthesis and harmony between the eternal antitheses and polarities of the universe: the worldly and other-worldly, the positive and the transcendental, the many and the one, the form and spirit, culture and faith, science and religion, caste disunions and vedantic oneness, image worship and the realization of the infinite (Brahma) ”

I have quoted this long passage by way of introduction to emphasize the truth, so often ignored, that the Hindu genius

has never shown any exclusive pre-occupation with this world or with the next but has achieved a great synthesis and harmony by its doctrine of social and spiritual unity

I shall take up first the discussion of the subject as considered in the newly-discovered but precious book—Kautilya's *Artha Sastra*. Mr. Shama Sastri's translation of the work is well-known, and Mr. Narendranath Law has based his *Studies in Ancient Indian Polity* on this work. To the latter book Professor Radhakumud Mookerji has contributed a valuable introduction. Kautilya's work was composed between B.C. 321 and 300. He was known also as Chanakya or Vishnuguptha. Though Dandi and Bana condemn his work, almost as Machiavelli was condemned by later writers, the book reveals a scientific grasp of social facts and phenomena and shows how highly-evolved sociology and political science were at that time. Professor Radhakumud Mookerji says

"The *Artha Sastra*, as will be amply evident from Mr. Law's *Studies*, is a unique record of the secular and practical activities and achievements of the Hindu genius as distinguished from the intellectual and spiritual, of which there is so much evidence in the extant Sanskrit and Pali literature, and of which so much has been said and written, and a proper study of this most interesting work is well calculated to remove one of the widespread and deep-rooted misconceptions about ancient Hindu civilization, which is supposed to have distinguished itself only in the sphere of thought, and to have miserably failed in that of action."

The learned Professor concludes thus

"In the *Artha Sastra* we find a combination of theory and practice, principles of Government, as well as administrative details and regulations, treated with a touch of refreshing realism which is born only of a living experience of actual problems and contact with facts. The system of polity as revealed in the *Artha Sastra* is complete in all aspects and details, and exhibits those features which are characteristic of India. Agriculture and commerce, arts and crafts for which India is ever noted, receive their due treatment and emphasis in the book, forests and mines, irrigation and famine, land revenue, census, central and municipal

government, cattle and livestock, are the eternal topics of Indian administration, conditioned, as every Government is, by its natural and historical environment. And when we find that all these familiar problems have been treated in the *Artha Sastra*—problems which are still exercising the British Government of India at the present day—we cannot but discover the operation of an evolutionary process which is ultimately governing the development of Indian administration through Hindu, Mahomedan, and modern times.”

Megasthenes has borne eloquent and valuable testimony to the high state of civilization during Chandragupta's reign. He says

“Of the great Officers of State, some have charge of the market, others of the city, others of the soldiers. Some superintend the rivers, measure the land and inspect the sluices by which water is let out from the main canals into their branches. The same persons have also charge of the huntsmen. They collect the taxes and superintend the occupations. They construct roads. The members of the first body look after everything relating to the industrial arts. The third body consists of those who inquire when and how births and deaths occur, with the view not only of levying a tax, but also in order that births and deaths may not escape the cognizance of Government. The fourth class superintends trade and commerce. Its members have charge of weights and measures, and see that the products in their season are sold by public notice. The Indians are well skilled in the arts while the soil bears on its surface all kinds of fruits which are known to cultivation, it has also underground numerous veins of all sorts of metals which are employed in making articles of use and ornament, as well as the implements and accoutrements of war.”

It is thus clear that the general description of ancient Indian Empires as mere tax-gathering empires is as much a myth as it is a libel and that a high state of practical achievement in social and political activities was reached in ancient India.

The information contained in Kautilya's great work on Local Self-Government, town-planning, town and village

formation and life, house-building, and architecture is scattered in various places and deserves to be focussed both for its intrinsic work and its revelation of the growth of civic and municipal life in India

Kautilya deals first with the formation of villages and with life in villages. In Book II he says that new villages should be slowly formed, either by inducing foreigners to immigrate (*parādésapráváhanena*) or by decentralisation of population by causing the thickly-populated centres of his own kingdom to send forth the excessive population (*svadésibhishchandavāmanāvā*). The king may construct villages either on new sites or on old ruins¹. This whole passage is quoted in full by Mallinatha in his commentary on verse 29 of chapter IV of Kaṇḍaśa's *Rāghuvamśa*. Kautilya says further that villages consisting each of not less than a hundred families and of not more than five hundred families of agricultural people of Śūdra Caste, with boundaries extending as far as a *krosa* (2250 yards) or two, and capable of protecting each other shall be formed². Boundaries shall be denoted by a river, a mountain, forests, bulbous plants, caves, artificial buildings, or by trees such as *Sālmali* (silk cotton tree), *Sami* (*Acacia Suma*), and *Kṣhira-Vriksha* (milky trees)³. There shall be set up a *sthantiya* (a fortress of that name) in the centre of eight-hundred villages, a *dronamukha* in the centre of four-hundred villages, a *khāvatika* in the centre of two-hundred villages, and a *sangrahara* in the midst of a collection of ten villages⁴. There shall be constructed in the extremities of the kingdom forts named by boundary-guards (*antapala*) whose duty shall be to guard the entrances into the kingdom. The interior of the kingdom shall be watched by trap-keepers, archers, hunters, chandalas, and wild tribes⁵.

¹ Kautilya's Artha Śāstras Book II. (Shama Sastri's Translation, page 51)

² Do Do page 51

³ Do Do page 51

⁴ Do Do page 51

Shama Sastri's Translation, pages 51-52

After dealing with the formation of villages, Kautilya gives us detailed instructions about grants of lands. Those who perform sacrifices, spiritual guides, priests, and those learned in the vedas shall be granted *Brahmadaya* lands yielding sufficient produce and exempted from taxes and fines.¹ Superintendents, accountants, *gopas*, *sthanikas*, veterinary surgeons (*arikastha*), physicians, horse-trainers, and messengers shall also be endowed with lands which they shall have no right to alienate by sale or mortgage.² I may here refer to a rule contained in Book II which says that rate-payers shall sell or mortgage their fields to tax-payers alone, that Brahmans shall sell or mortgage their Brahmadaya or gifted lands only to those who are endowed with such lands, and that otherwise they shall be punished with the first amercement.³ Lands prepared for cultivation shall be given to taxpayers only for life, and unprepared lands shall not be taken away from those who are preparing them for cultivation.⁴ Lands may be confiscated from those who do not cultivate them, and given to others, or they may be cultivated by village labourers and traders, lest those owners who do not properly cultivate them might pay less to the Government."

According to Kautilya, the king was bound to take a paternal interest in cultivation and in the welfare of his subjects in various ways, and many of the rules in this subject have a modern note and show how highly civilised India was then. If cultivators pay their taxes easily, they may be favourably supplied with grains, cattle, and money.⁵ Thus they were given agricultural loans—not only in the shape of money

¹ Shama Sastri's Translation, page 52

² Do Do page 52

³ Do Do page 218

(The first amercement is 12 to 96 panas, the middle amercement is 200 to 500 panas, and the highest amercement is 500 to 1000 panas.)

⁴ Shama Sastri's Translation, page 52

⁵ Do Do page 52

⁶ Do Do page 52

but also in the shape of grain and cattle. Either on the opening of new settlements or on other emergent occasions, remission of taxes shall be made.¹ The following highly-enlightened rules on remission of taxes appear in Book III and deserve close attention even in modern times that are full of self-praise about their achievements.

"In the case of construction of new works, such as tanks, lakes, etc., taxes on the lands below such tanks shall be remitted for five years. For repairing neglected or ruined works of similar nature, taxes shall be remitted for four years. For improving or extending water-works, taxes shall be remitted for three years. In the case of acquiring such newly-started works, taxes on the lands below such works shall be remitted for two years. If uncultivated tracts are acquired for cultivation by mortgage, purchase, or in any other way, remission of taxes shall be for two years. But of crops grown by irrigation by means of wind power or bullocks or below tanks, in fields, parks, flower gardens, or in any other way, so much of the produce as would not entail hardship on the cultivators may be given to the Government. Persons who cultivate the lands below tanks, etc., of others at a stipulated price or for annual rent or for certain number of shares of the crops grown or persons who are permitted to enjoy such lands free of rent of any kind, shall keep the tanks, etc., in good repair, otherwise they shall be punished with a fine of double the loss."²

Kautilya says further that irrigational works are the source of crops and that the results of a good shower of rain are always attained in the case of crops below irrigational works (page 374). It is thus clear that the State took great interest in irrigation then.

Though this subject is only remotely allied to the subject now under discussion, I wish to refer to it briefly here as the Government in planning villages and towns always bore in mind the problems of irrigation. Megasthenes says "The greater part of the soil is under irrigation, and

¹ Shamu Sastri's Translation, page 52

² Do Do page 216

consequently bears two crops in the course of a year" (Book I, Fragment I) Again, he says "Some superintend the rivers, measure the land as is done in Egypt, and inspect the sluices by which water is let out from the main canals into other branches, so that every one may have an equal supply of it"¹ *Arthashastra* clearly shows all this I shall refer also in passing to the rule that the king shall construct reservoirs filled with water either perennial or drawn from some other source, and that he may provide with sites, roads, timber, and other necessary things those who construct reservoirs, places of pilgrimage, and groves²

The king supervised also other aspects of local and municipal life and activity Kautilya says that he shall carry on mining operations and manufactures, exploit timber and elephant forests, offer facilities for cattle-breeding and commerce, construct roads for traffic both by land and water, and set up market towns³ The king shall exercise his right of ownership with regard to fishing, ferrying and trading in vegetables in reservoirs or lakes⁴ Those who do not heed the claims of their slaves, henchmen, and relatives shall be taught their duty⁵ The king shall provide the orphans, the aged, the infirm, the afflicted, and the helpless with maintenance, he shall also provide subsistence to helpless women when they are carrying and also to the children they give birth to⁶ Elders among the villagers shall improve the property of bereaved minors till the latter attain their age, so also the property of Gods⁷ When a capable person other than an apostate or mother neglects to maintain his or her child, wife, mother, father, minor brothers, sisters, or widowed girls, he or she shall be punished with a fine of twelve *panas*⁸ When

¹ Megasthenes, Book I, Fragment XXXIV

² Shama Sastris Translation, page 53

³ Do Do page 52

⁴ Do Do page 53

⁵ Do Do page 53

⁶ Do Do page 53

⁷ Do Do page 53

⁸ Do Do page 53

without making provision for the maintenance of his wife and sons, any person embraces asceticism, he shall be punished with the first amercement, likewise any person who converts a woman to asceticism¹ No ascetic other than a vana-piastha, no company other than the one of local birth, and no guilds of any kind other than local co-operative guilds shall find entrance into the villages of the kingdom² Nor shall there be in villages buildings intended for sports and plays Nor in view of procuring money, free labour, commodities, grains, and liquids in plenty, shall actors, dancers, singers, drummers, buffoons, and bards make any disturbance to the work of the villagers, for helpless villagers are always dependent and bent upon their fields³ The king shall protect agriculture from the molestation of oppressive fines, free labour, and taxes, herds of cattle from thieves, tigers, poisonous creatures, and cattle-disease⁴ He shall not only clear roads of traffic from the molestations of courtiers, of workmen, of robbers, and of boundary guards, but also keep them from being destroyed by herds of cattle⁵ The wisdom of these provisions is very apparent and they show how much is yet to be done in modern times in these respects

[To be continued]

Co-operative House Building in Bombay.

The Saraswath Co-operative Housing Society, Ltd

IN writing on the housing problem in our large cities, we insisted on the importance of evolving co-operative building organisations and commended the example of Bombay in forming the Co-operative Housing Association whose object is to spread a sound knowledge of the principles of the movement One of the first fruits of the labours of this Association is the formation of the Saraswath Co-operative

¹ Shamas Sastri's Translation, page 54

² Do Do page 54

³ Do Do page 54.

⁴ Do Do page 54.

⁵ Do Do page 54.

Housing Society and we have no doubt that a brief account of its working---taken from the interesting pamphlet published by its energetic Honorary Secretary, Mr Talmaki, a copy of which has been kindly supplied to us---will be of interest to our readers.

Now, the Saraswats are a compact, homogeneous community in the City. A special committee was appointed to investigate their housing conditions. The committee first divided the community into various classes according to occupation. They, then, considered which of them could contribute a portion of the cost of constructing houses and also could be shifted from their quarters without much inconvenience to their work. The aggregate house-rents paid by this class of persons were then gone into and a detailed scheme was worked out for erecting sanitary houses for them on the co-partnership system.

With a group of men more or less homogeneous, aiming at a fair standard of comfort and able to make the requisite monthly payments, a start was made in 1914. By-laws were framed and approved and the Society was registered. Initial financial difficulties---due, in a large measure, to the novelty of the idea---had, however, to be overcome, and these would have proved to be insuperable but for a loan of Rs 24,000, repayable in 10 years and bearing interest at 4 per cent, advanced by Sri Prabhaskar Pattani.

As already stated, the Society is organised on the co-partnership system. The permanent capital is made up of 20 rupee shares and 30 rupee loan stock bonds payable in a lump sum or ten consecutive monthly payments. Interest on loan stock bonds is fixed at 5 per cent and the dividend on share capital is also limited to 5 per cent. These are not repayable though the Society may, at its discretion, repay the loan stock bonds. As the interest payable on these latter is a charge on the gross profits, they form a good investment. Loans and fixed deposits are also received. The capital of the Society now consists of Rs 32,620 (paid up share capital), Rs 24,000

(loan from Shri Piabhashankar), Rs 7,566 (loan from S V Co-operative Credit Society) and Rs 7,815 (deposits at $4\frac{1}{2}$ per cent)

The Society obtained a plot of ground from the Improvement Trust Board on 999 years' lease. The President—the Hon'ble Mr J P Ousri, I C S, to whose sympathy the Society is deeply indebted—reduced the price from the scheduled rate of Rs 18-12-0 to Rs 15 a square yard and also allowed some further concessions. Tenements were then constructed. The rents vary from Rs 25 to Rs 33 per month for each tenant. The amounts collected defray all the charges and leave a balance for contribution to shareholders. The members have a common interest in keeping down repair and other charges as all the savings under these heads come back to the tenants in the shape of bonus on rents.

The organisers believe that the co-partnership system is, on the whole, better suited to our needs than the individualistic scheme, the following summary taken from Mr Talmaki's *History and Working System* of the Society will be found instructive.

From Members' point of view

IN THE INDIVIDUALISTIC OR BUILDING SOCIETY SCHEME

1 A member has to pay the entire cost of the house he occupies and the membership is, therefore, within reach of a limited circle.

2 A member has to pay a higher rate of interest on the loans than that at which the Society raises its capital, the difference being the only source of income of the Society.

3 Each member owns independent of the house he lives in.

4 The property is controlled by an individual and its condition will, therefore, vary with the variations in his circumstances.

5 A member having to leave the place where the house is built has to sell it for any value he can get.

IN THE COLLECTIVISTIC OR TENANT CO-PARTNERSHIP SCHEME

1 A member pays only part of the cost of the house he occupies, and the membership is, therefore, within reach of a wider circle.

2 A member gets the full benefit of the loan raised by the Society without having to pay extra interest thereon.

3 Members enjoy all the advantages of independent ownership without being tied to the property.

4 The property remains under the control of the Society and therefore it will always be kept in good condition.

5 A member having to leave the place where the Society owns the property can arrange to get back the full amount of his investment from the Society or through the incoming occupant.

From Investors' point of view

IN THE INDIVIDUALISTIC OR BUILDING
SOCIETY SCHEME

1 The property may change hands at any time giving rise to uncertainty as to the kind of person who may next occupy it

2 The condition of the property will depend upon the condition of the purse of the person owning it

3 No chance of the sinking and the repairs fund in the case of privately owned property, and no long term loans can therefore be advanced, on its security

4 The title to individual property is subject to incurrence of personal law of the owner

5 Punctual payment of interest on loan will depend upon the pocket of the borrower

IN THE COLLECTIVISTIC OR TENANT
CO PARTNERSHIP SCHEME

1 The property always remains in the Society's hands and the choice of the person who will occupy it rests with the Society

2 The condition of the property will always be kept up to date, the Society being backed by the repairs fund

3 Sufficient provision being made for keeping the property in good condition through the repairs fund and for replacing in due course through the sinking fund, loans to such a Society can be advanced for any length of time

4 The Society being the owner of the property, its title will ever remain free from the least shadow of doubt

5 Punctual payment of interest is provided for out of the Society's income

We trust that the success of the above scheme—started under conditions in regard to price of land, etc., which are decidedly more unfavorable than those obtaining in Madras—will afford encouragement to co-operators in Madras to take steps to form similar building societies here

Slums and Town Nuisances.

[BY DR M R SAMEY, M D, D P H (U S A),

M R SAN I, (LOND)]

SMOKE is unquestionably one of the greatest of the positive nuisances. It is just as unquestionably one of the least necessary of these positive nuisances. Statistics

The Smoke Nuisance show that vast damage in a material way results from the emission of black smoke

From the hygienic standpoint black smoke is certainly a nuisance and a damage. It clogs the human air passages and the lungs, and is known to decrease life and to have an injurious effect in many disorders.

The use of electric power, generated in large volumes under conditions which make the emission of smoke notably uneconomical, or generated from water power, will obviously tend to reduce the emission of smoke in communities and the eventual electrification of railroads may be expected to solve the more difficult part of the smoke problem

It may be briefly summed up that every avoidable noise of a distracting character is unhygienic and wrong, and in the properly-conducted city such noises will be suppressed or reduced

The absence of sewers in a town undoubtedly creates a nuisance and, therefore, it may briefly be insisted upon that a proper, modern, well-designed and successfully-operated system for removing the wastes of human life is essential in any decent community Just what that method is to be must be determined in each individual instance It is no longer considered right to dispose of these human wastes by turning them into a convenient water-course, and therefore, in addition to such division of liquid wastes as will keep house sewage distinct from storm water and street drainage, there needs to be taken up in any community some adequate system of sewage disposal and possibly of purification It may be reiterated that no community has the right to thrust the unsanitary result of the wastes of its own life either upon its own citizens or upon the citizens of another community

The main reason for disposing of stagnant water is that it is in it that the mosquito breeds A secondary reason is that a pond or puddle of stagnant water seems inevitably to attract tin cans and refuse which tend to become much more unsanitary than the water itself

A general misconception exists in regard to stagnant water with a green scum This scum is plant life and is not unwholesome in itself, indeed, it frequently takes up through

the process of nature impurities in the water, which are thus turned through nature's economics to what may be a useful purpose

Unquestionably, stagnant water should usually be drained. Where it cannot conveniently be drained, a thin film of mineral oil will, at least, prevent the breeding of mosquitoes.

Public dumping grounds seem to be necessary in modern community economics. They are usually unsanitary, and they

Public Dumps tend continuously to become public nuisances. Where the dumping is of clean ashes only, as is often ideally proposed, there can be no harm done and no nuisance created. When, however, a disgusting odour comes from a dump upon which supposedly nothing but clean ashes have been placed, obviously somebody has gone wrong. In practice dumps are always odorous, and should have, for that reason, sharp attention.

Unquestionably, filth in backyards and vacant lots is a patent means of continuing the slum and creating a town nuisance. Under the prevailing idea of the sacredness on private property, the disposition to allow the individual to do what he pleases on his own premises has given rise to filthy conditions. With the modern conception of the responsibility of the individual to his fellows, and under the broad scope of the communal police power, it is certainly practicable to prohibit the collection of filth or material of an unsanitary nature close to human habitations, and to have it removed at the cost of the offender, where it has been deposited.

A little attention on the side to the promoting knowledge of the desirability of the use of plants, flowers, and trees in backyards sufficiently open to the sun and air for their growth will often entirely remove the trouble from unpleasant backyards. Any movement in a town which will stimulate the pride of the citizen on his own surroundings and about his own home will help amazingly in eliminating the dirty backyard.

Duty vacant lots should be eliminated under the Municipal power of the community by requiring the owner of them to make his premises sanitary and sightly. It may be that he cannot be legally forced to keep it sightly, but it is certain that he can be compelled to keep them sanitary. Therefore, when a vacant lot becomes a dumping ground for refuse, slyly placed there by citizens who know better, the Municipal authorities should take action either to catch the offenders in the act or force the owner of the lot to himself protect his own property.

The entire problem of slums and town nuisances has been considered here from a rather broad humanitarian standpoint, avoiding, for the most part, definite directions, and trying to state as well as feasible the determining principles which relate the subject under discussion to public hygiene. The cause of public health cannot be advanced in any way so well as in bringing about a feeling that every man is responsible, not only for his own acts, but for the influence of these acts upon his neighbours, whether that influence arises through noises he makes, through smoke or refuse he puts upon his neighbours, through unsanitary conditions he creates, through land greed or erection of improper dwellings, or through any other act which makes less wholesome, less happy, and therefore less efficient, the lives of his fellow-citizens.

Local Self-Government in Bombay.

[BEING THE IMPRESSIONS OF A "BACKWARD MADRASI"]

The Bombay Corporation

LAST December I went to Bombay as a delegate to the Indian National Congress. The atmosphere was surcharged with new currents of thought. Self-Government was the watchword and I thought to myself, what city in India could boast of a more advanced constitution for local self-government or of a more glorious record of civic progress than this city? While her claim to be "the first in India"—for

that is the motto emblazoned on the standard of her municipality—may be worthily contested by Calcutta, no one questions to-day the foremost position occupied by the Municipal Corporation of Bombay in this country. It is no doubt the cynosure of neighbouring eyes, its constitution the envy of the capital towns and its success the boast of all advocates of self-government. For a political pilgrim, here, indeed, was the Mecca of self-government and I longed to have a glimpse of the *sanctum sanctorum*.

With a bosom heaving with the hope of studying on the spot how the advanced citizens of this great city acquitted themselves of the functions of municipal government, I betook myself one afternoon to the head-quarters of the Corporation. The offices were, however, closed as it was one of the Christmas holidays and the only thing left for me was to seek solace in loitering for some minutes in the Council Hall which, fortunately, I found a punka-wallah to open for me.

It is indeed a beautiful hall, imposing in appearance, but, as I found afterwards, poor in its acoustic properties. In the centre stood the President's chair. Vacant as it was, in it were symbolised all the traditions and glory of the House and I instinctively offered my *pūja* to it. On the right of this throne was the Municipal Secretary's chair and next to it was the revered chair of Sir Pherozeshah Mehta draped in black. Ah, not those walls and arches that I saw around me sustained that noble pile! It was that departed hero who propped and supported the entire edifice, carrying on his shoulders, almost alone, the burden of the Corporation for nearly fifty years till the hour of death. Sir Pherozeshah, Bombay's *beau idéal* of a citizen, whole India's idol, what would I not give to hear thy gifted voice in this hall, this glorious battle-field on which you have valiantly fought so many bloodless battles in defence of the prerogatives of the people!

With a heavy heart I retraced my steps, speaking to myself such mournful musings were of no avail, but little

dreaming that within a few days I might be able to hear in that very chamber, if not the voice of the great patriot, at least an echo of it. Thus it came to pass. My trip to Northern India was of a somewhat shorter duration than I had anticipated. I had therefore a week to spare and I decided to spend it in Bombay.

On the 13th January, I paid a second visit to the Municipal Hall. The civic fathers had assembled that afternoon. I took a seat in a corner with a light step, mortally afraid of creating the slightest noise. The members of the Corporation, however, did not appear to mind any amount of noise. While a member was addressing the House, some of his colleagues merely indulged in conversation with their neighbours, others gaily interposed now and again, the President and the Secretary were engaged for a while in a *tete a tete* and the Municipal Commissioner's head was buried in a bundle of papers which lay in front of him and I could see the red danger signal attached to them for arresting immediate attention. The clerks and peons moved to and fro and to a room adjoining the hall individual members retired at will to take tea. Altogether it seemed to me to be a happy family affair.

When I was there, the question of revising the schedule of salaries of clerks and other officers was being discussed. The Standing Committee had recommended for the clerks in the lowest grade a monthly salary of Rs. 30 rising to Rs. 45 in five years, with a proviso that if owing to congestion a clerk should remain for three years more in the same grade, he should get an allowance of Rs. 5. A very liberal wage this! The poor quill-drivers on our side would bless our Municipality to follow in the footsteps of her sister in Bombay. Indeed, after the publication of this letter Bombay is sure to be flooded with applications for appointments from every nook and corner of this Presidency. But our Bombay friends thought otherwise. Some of the members felt

the Corporation were simply sweating labour and demanded a more liberal scale of salaries for the junior clerical staff. This led to a spirited debate which culminated in a scene the like of which we seldom hear of in our backward and benighted city.

One of the members remarked that another had thrown out pearls which should be consigned to the waste paper basket. The other member rose to say something. Thereupon the member in possession of the House urged that it was "most abominable" that a councillor should be thus interrupted. The President, however, allowed the aggrieved member to offer a personal explanation—rather an unusual procedure which provoked a bitter protest. "I protest against your conduct," said the speaker. "It shows your ignorance of the rules of procedure." There was forthwith an explosion of righteous indignation on all sides. Members rose one after another to protest against such disrespect being shown to the chair. "Whatever the ruling of the President, for the time being it must be accepted." But all the sage counsel notwithstanding, the unruly councillor stood impenitent. "I am in the right," he shouted, "and I have not the least intention to apologise."

These words of defiance recalled to my mind the amusing story of similar defiance of the Speaker of the House of Commons by Sir George Rose in the early years of the last century. In those days members of the House used to drink freely. It is reported that one evening Sir George turned in drunk and called upon the Speaker for a comic song. The whole house was stunned with astonishment. As soon as the Speaker could collect his scattered senses, he ordered the Sergeant-at-Arms to take the honourable member in custody. Sir George was brought to the Bar of the House and when he was called upon to beg the Speaker's pardon, he swore that he would beg no man's pardon, "not even King George's, and certainly not that little chap's with the big wig." He was therefore committed to the lock-up of the House to sleep off his debauch.

Needless to say, next day he was penitent and sober and begged the Speaker's pardon

Here was another Sir George Rose not inebriated, yet equally defiant. I looked round the Hall to see if a Sergeant-at-Arms was nigh. None however was in sight and I was wondering what the President would do. He, however, kept his temper remarkably well and simply asked the member to proceed with his remarks, warning him at the same time that if he persisted in defying the ruling of the Chair the meeting would have to be adjourned. So that was the instrument with which the President was armed! Adjournment of the meeting! One might well wonder how it would hit the disturber of the peace. However, the member in question resumed his remarks, but he was soon pulled up by the President and warned that as he was speaking a second time he should confine his remarks to the new matter introduced in the amendment on which he was speaking. The speaker, however, went on in the devil-me-care fashion when the helpless President again pathetically observed that if his ruling was not respected, he would be compelled to adjourn the meeting. "If it is your wish to gag me, I don't wish to say anything more," said the member and he took his seat to the relief of the sorely tried assembly.

To me all this was very edifying indeed. After the meeting was over, I enquired of a friend what would have happened if the meeting had been adjourned. "The recalcitrant member would have been asked to apologise at the next meeting." "And if he refused?" "Well, then a vote of censure would have been passed." "And if he still snapped his fingers at you?" "Another vote of censure," and so on *ad infinitum*! Rather a clumsy way this of repressing pugnacious members. They may break up meetings after meetings and you do nothing more than waste paper and ink, not to say breath which of course counts for nothing in such assemblies, on votes of censure!

That storm, however, was soon followed by a lull. The Municipal Commissioner pointed out that the poor clerks had been already enough tantalized. It was obviously desirable not to remove the cup from their parched lips simply because it was not quite full. In spite of difference of opinion in regard to one of the items the schedule might be accepted. There was nothing to prevent the Corporation from reconsidering that item again. Thereupon Mr. D. E. Wacha, who had taken up the cudgels on behalf of the clerks, withdrew his amendment and the whole schedule, formidable as it was, was adopted without a word of further comment. With the same indifference were voted away at the next meeting budget grants amounting to more than a crore and a quarter without any question or criticism. Within half an hour the whole expenditure side of the Budget was gone through. Were I not an eye-witness to this amazing performance, I would scarcely have believed our Bombay friends were capable of such a feat. It was, forsooth, a case of swallowing camels whilst straining at gnats.

Even after the abstruse items of the Budget were gone through, scarcely any other item of business aroused interest. "Wishy was up and Washy was down", continuously proposing resolutions after resolutions until at last the question of allowing the Health Officer of the Municipality to take up outside work came on for consideration. It was in this connection that I heard the echo of Sir Pherozeshah's voice. He had pointed out in a minute, written a few days before his death, that the Municipal Act required that that officer should devote his whole time and attention to the duties of his office and that even the Corporation had no power to allow him to take up the appointment of Professor of Public Health at the Tropical School of Medicine. Counsels' opinion was obtained. They upheld the views of Sir Pherozeshah and the question before the Corporation was whether the Act should be amended to obtain the powers. Several members protested against the idea of tinkering with legislation. They read out passages from the

deceased mentor's minute to show that the existing disability under the Act was the result of mature deliberation when the Act was passed, but the majority in favour of the amendment was determined to carry the day. A poll was demanded. Doors were closed. Fortunately, strangers were not asked to withdraw. Members divided themselves on two sides, a count was taken and the result was that a substantial majority was in favour of the amendment of the Act.

I for one was not sorry for the result. Why should the Corporation's hands be fettered in this respect? Could they not be trusted to exercise their discretion and decide whether or not they would on particular occasions authorize an officer to undertake additional duties in public interest? If even in the case of the foremost Municipality in India it is feared that such powers might be abused, then adieu all dreams of Self-Government! But although I was not sorry for the result of the voting, I was greatly depressed by the voting itself. From what I heard whilst the poll was being taken, I gathered that the "official side" had mustered strong on the left of the President and that it was now-a-days hopeless to carry any proposal in the face of opposition from that section of the House. Although, therefore, my heart was with this section, I would have been better pleased had it been beaten by the other side.

Outside the Municipal Office also I heard the same sad story. For some years the official side has been numerically very strong. Sir Pherozeshah's towering personality, however, was a match for it and his persuasive tongue often used to win it over to his side, but since his death it has known no defeat and fears none.

What a regrettable situation under an ideal constitution! Our Calcutta and Rangoon friends are enamoured of the Bombay system. Let them study this system closely and get some knowledge at least of the inner life of the Corporation.

of that city I do not know if what is called the official side always slavishly registers the decrees of the Executive. It may probably be often in the right, as it seemed to me it was on the occasion I have just referred to. But that is not the point. The question is why should a local body such as a Municipal Corporation be divided in factions? I was told that until recently the Bombay people knew no parties but that at one time Sir Pherozeshah got such an ascendancy and commanded such a large following that the officials thought it necessary to clip the wings of the eagle. If that was the case, there was some reason for collecting for a while all available forces on one side. No one in these days would plead for Cæsarism. But what I do not understand is the existence of such a party when there is absolutely no need and no justification for it.

The present situation has cast a gloom over the whole public of Bombay. No one spoke to me about Municipal Government with any warmth. Nothing was cheerily hoped for. Nothing was warmly worked for. The ratepayers' elections were on and I learnt that except in the case of one of the seven wards of the city scarcely any contest worth the name was expected. Similarly, no interest was evinced in respect of the election of sixteen members by the Justices of Peace. I was told that this election goes according to the tickets issued by the official side and that those not included in the ticket are foredoomed to failure. In fact after my return to Madras I read that only 17 candidates came forward to contest 16 seats. That is an index of the interest taken by the people in the Municipal Government of the city. And yet all India points to Bombay as the model of Local Self-Government. Ah me, it is the distance that lands enchantment to the eye. *Urbs prima in Indis* forsooth! My idol is broken, but after my pilgrimage to the great shrine, I have returned home a sadder but wiser man.

Local and Municipal Administration during 1914-15.

[United Provinces]

WE have perused with interest the annual reports on the working of the District Boards and the Municipalities in the United Provinces of Agra and Oudh for the year 1914-15. They are not drawn up with the same fulness and comparative statistics contained in the corresponding reports of this Presidency. In Madras a good deal of information comparing the results of the year with those of past years are shown in the body of the reports, covering every branch of administration. The same cannot be said of the reports now under review. The chief features, however, might be briefly noticed. The Government of the United Provinces seem to have initiated a new policy in regard to financial help to local bodies and to have systemized the grants much more carefully than in other provinces. The Local Government has entered into definite financial contracts with the Boards for a number of years and all financial assistance from provincial funds is thus regulated. The system is a great improvement and is similar to the provincial settlements between the Local Governments and the Imperial Government and is very much to be commended. We regret that we are not in a position at present to state definitely the terms of the financial contracts between the Boards and the Local Government, but we trust that other Local Governments will examine the question with a view to improve resources of local bodies and to abandon the system of doles now prevailing. In Madras, the road grant of 14 Lakhs is the only item of provincial revenues which is certain for distribution. The re-organization of the system of primary education and the constitution of primary school committees is another direction in which progress has been achieved in the province during the year under review. The institution of new primary schools committee is intended to provide a fresh channel for local endeavour.

and an inducement to members to take a responsible interest in District Board activities in their own neighbourhoods. The Districts in the United Provinces are, it must be noted, very much smaller than in Madras, the average size being between 1,500 and 2,000 square miles. The District Boards in that Province are therefore much lighter charges than in Madras and non-official agency may suitably be employed in their administration.

Coming now to municipalities, the keynote of the development of Municipal administration during the year was one of suspense. The municipal amendment Bill which has formed the subject of acute controversy in the Province is now under consideration. The report states that the amendment proposed in the law are intended to secure "a further substantial advance in Local Self-Government" in the United Provinces. Whether this hope will be realised or not depends very much upon the spirit of the new amendments. The report however says "that task of the Boards under a new system will be a heavy one and that much depends upon the fuller realization of financial responsibility." It is satisfactory to note that octroi duties are being gradually replaced by direct taxation and that they have been abolished in 37 Municipalities. It is to be hoped that in the course of a few years these vexatious imposts will be altogether abolished. The present action is due to the labours of a Committee in the United Provinces which sat a few years ago and reported on the whole subject of Municipal taxation. Under the law, as it existed, articles of food and drink, fuel, building materials, animals for slaughter, drugs, gum, spices, tobacco, cloth, metals and other sundry articles of daily consumption were subjected to octroi duties in the Municipalities of United Provinces. These have now been abolished and direct taxation on house and land property and on the professions have been introduced. The change has caused a certain amount of opposition and in one of the Municipalities the Municipal commissioners had to resign as a consequence of public protest against new taxation. Another

form of new taxation which is now being tried is terminal taxation introduced in 1914 in Cawnpore. The question of the introduction of terminal taxation in other large Municipalities such as Lucknow and Agra is also under consideration and it is believed that there are good grounds that the new Cawnpore schedule for terminal taxation is based on principles which apply to every Municipality. The Local Government in Madras has called on Municipalities to submit proposals for the improvement of financial resources of Municipalities and it will be interesting to examine how far and to what extent a terminal tax can be introduced in this Presidency. We know that the Madras City Municipality have had in contemplation proposals for the levy of terminal tax. Another interesting feature of the activities of the year is the town expansion committee appointed by the Local Government to examine the needs of the important towns in the Province. This step to provide for the future is a very wise one and the Government of Sir James Meston is to be congratulated on the step. The committee was presided over by Sir Henry Ledger and concluded its sittings, but it is understood that its final recommendations, which are of a very comprehensive nature, are not yet before the Local Government. We trust that the Madras Government will wake up betimes and take similar action in this Presidency.

The Inside and Outside of an Indian Home.

[BY RAO SAHIB U. RAMA RAO, MEDICAL PRACTITIONER.]

II Madras Houses

HOUSES in Madras are generally large, consisting of two, three or four courtyards depending upon the size of the house. Round the courtyard there are verandahs, kudams and sometimes bedrooms. The idea of building rooms and kudams round the courtyards, is scientifically good as they open directly to the side and of the courtyard, ensuring thereby a supply of pure air and light. But if, as is frequently

the case at present, the house has two or more storeys, or if both the sides of the house are joined together, or if the adjoining buildings are very high, or if there is no open space both in front and behind equal in length to the height of the building, then free circulation of air and light in the house is prevented. To remedy the defects, the best thing is either to have one side of the courtyard open or to allow at least 3 feet of open space along the whole length of one side of the house or still better on both sides for free ventilation. If such open space is not allowed, the room cannot properly be ventilated. Most of the rooms in Georgetown houses are low, small, dark, ill-ventilated, badly-lighted and do not communicate with the outside air which is essential for proper purification of foul air. In addition to these defects domestic animals such as cows, calves, dogs, parrots, cats, fowls, etc., are kept inside the house, very often by the side of the bedroom. These animals besides rendering the air impure by their constant breathing, make the house very insanitary by their excretions and washings. It should be remembered that the animals foul the air as much as men or even more. The minimum capacity of the sleeping apartments wherein we spend nearly one-third of our lives, ought to be at least 10 feet long 10 feet broad and 10 feet high or very near it for one individual. It ought not to be higher than 16 feet, for the dead air, i.e., the used up air will lodge too high near the ceiling for the normal currents of air to drive it out of the room. In such cases ventilating windows ought to be placed close to the ceiling. The room ought to be provided with at least two windows, one door and one ventilator which must be very near the ceiling. The windows and doors should be nearly opposite to one another so that the winds may pass freely from one side to the other. Ventilators near the roof are necessary to drive foul air which is lighter than pure air and found in the upper part of the room.

Another defect in the sleeping apartments is that they are crowded with unnecessary furniture, sometimes with pots

and bags containing articles of food, which will still further reduce the cubic air space. The ideal bedroom ought to contain nothing more than one or two cots with beds, one small table and two chairs if necessary and it must be well ventilated. To secure this, at least one or two sides of each room should be in free communication with the outer fresh air, by means of doors and windows and if possible, should face the breeze. Some people are under the impression that punkas keep the room well ventilated and cool even if all the doors and windows are shut. But punkas working in a room without proper arrangements for inlet and outlet of air are no good as they cannot remove the vitiated air from the room. Punkas are excellent for keeping the room cool and well ventilated and also to equalise temperature, provided there are doors and windows opposite to one another (cross ventilation) which should always be kept open when punkas are working. The smaller a room is, the more frequently must the air in it be completely changed without producing draughts.

Another common mistake to which prominent attention must be drawn is to give the worst and ill-ventilated room in the house to a sick person or woman in child-bed. Patients are shut up in a room with every available door and window closed for fear of catching cold. On the other hand, there is more chance of catching cold in an ill-ventilated room than in a well-ventilated one, as the germs of disease thrive well in vitiated atmosphere. So, sick patients must be given the largest, brightest and best ventilated room in the house. Professor Peters says "One takes cold by the body, not by breathing. So, cover yourself well in bed, breathe pure cold air and you will be warmed."

Another defect in some houses is that the same apartment is utilised both for cooking and sleeping purposes. You must know that fire and lamps spoil the air as much as living animals. Therefore fire should not be burnt inside the room, where people live, unless there are ventilators or chimneys to

remove the foul air. There is an impression that lamps do not foul air. In fact, two candles or two oil lamps foul as much air as one man. A good kerosine oil lamp of moderate size is equivalent to seven men in its power of fouling air. So, the habit of keeping a light burning inside a closed bedroom is unhealthy. The only light that does not foul the air is the electric light which does not vitiate the air nor deprive it of its oxygen nor yield to it carbonic acid gas, water-vapour, &c.

Kitchen—The kitchen is often the part of the house which is most neglected, though the rest of the house is tastefully built and furnished. The majority of the kitchens are deficient in size, ventilation and other particulars. This is unfortunate as the air of the kitchen affects not only the health of the people who live in it, but also the food that is cooked in it. So, kitchens ought to be well-ventilated, dry and clean.

Another defect in house construction is that there is no proper provision made for the free admission of sun-light—especially in Muhammadan houses. Some are absolutely dark. Even during day time, assistance of artificial light is needed before one enters the room. Such rooms are most insanitary. Sun-light is essential to health. Direct sun-light not only keeps the room dry but also destroys disease germs which cause fever, consumption, etc. The more sun-light there is in a room, the purer the air will be. There is an Italian saying, “where the sun does not enter, the doctor must”. This is perfectly true in such houses. Sun light has direct influence on health as it has on the growth of plants. So, young growing children specially, need all sun-shine possible. Living in dark rooms makes people pale, listless and depressed and their power to resist disease is undermined. All these are in much evidence in gosha ladies.

The closet, kitchen, stable, and cow-yard should be built on one side of the back of the house so that the breeze may not blow from them to the house. All rubbish, sweepings,

kitchen refuse, scraps of vegetables, leavings of meals, peelings and stones of fruits, dirty rags, waste paper, droppings of cows, horse and other animals, etc., should be thrown into a receptacle which must be emptied daily into the public dust bin, not outside it as is very often done. If there is no public receptacle close by, it must be buried under ground or burnt, otherwise they decompose and foul the air and harbour and breed flies. The liquid refuse such as those from bath room, kitchen, privy and water used for cleaning, cooking vessels, etc., must be emptied into the street drain, carried to it either through non pipes or surface made of pucca bricks lined with cement. Otherwise the waste water soaks into the soil of the house compound and fouls the sub-soil water, very probably the well water in the vicinity which is used in some cases for drinking purposes.

If there is no public drain close by and if there is a garden in the house compound, the waste water may be utilised for gardening purposes or if there is no garden, may be carried to a circular cesspool (of course lined with cement) which must be emptied often. Otherwise the cesspool may contaminate the well. The system of having cesspool inside the house is highly objectionable as this harbours and breeds flies.

Another great defect is that latrines are situated very close to the dwelling rooms and that they are ill ventilated and dark, not opening directly to the air and that they are very often by the side of the main entrance to the house. The result is that whenever the wind blows, it drives the foul gas from the latrine into the house. Therefore latrines should be outside the general house buildings and there should be a space of at least 4 ft., between it and the nearest wall and it must be at the back of the house. A latrine must never be closed. The night-soil should not contaminate the ground soil, and should not be allowed to accumulate near the house for a long time. It should be removed at least twice a day. To minimise the escape of emanations, excreta may be covered with dry earth or

dry ashes and the floor of the privy must be washed twice a day and some disinfectant such as phenyle be sprinkled about the place. The urine and ablution water should be prevented from soaking into the ground and should be taken into a public drain or cesspool. For this purpose the privy platform and the lower 2 ft. of the latrine walls should be made of masonry lined with cement, the floor must be plastered and should be raised at least 6 inches above the adjoining ground with a slope towards the drain. There are still a number of houses in Madras where there are cesspit closets, *i.e.*, pits dug in the ground wherein the night-soil is deposited day after day. The result of such closets, apart from their fouling the air, harbouring and breeding flies, is that they contaminate the sub-soil water and very often the well water. Such closets are highly dangerous and ought not to be used at all. Even if the cesspit closets have to be used as closets, they should be carefully built with impervious materials and emptied from time to time. To minimise the nuisance of such closets, the best thing to do is, every time one goes to defecate, to throw some dry earth or dry ashes or sand over the excreta, as dry earth has a deodorizing power.

Another very common defect is overcrowding in houses. You must remember that people die twice as fast where they are crowded as in places where they have plenty of fresh air. Overcrowding can be realised by a nocturnal visit into one or two of the crowded streets in George Town. In these streets some times as many as 4 or 5 persons sleep in each ill-ventilated room which is not even fit to be occupied by one, while in some big houses 75 to 100 persons or even more can be counted as their daily occupants.

As if the overcrowding was not enough of a curse for the city, the poor of Madras, who form more than 75 per cent of the population, have to put up with all the attendant filth and refuse lying unremoved by the Municipal Sanitary authorities for several hours, if not for days, near their houses.

Most of the tenements in big houses consist of small ill-ventilated, damp, unwholesome rooms and are overcrowded with people

Many of them who go to work during the greater part of the day on returning home, can scarcely get more breathing space than that which is obtainable in the shape of barest sleeping accommodation at night. The drains in such lodging houses are faulty and leaky. In some houses there are no drains at all to carry waste water to the public drain nor even to the cesspool. Water simply stagnates by the side of the house. Poisonous emanations from such leaky drains and from decomposing vegetables and house refuse, and noxious odours from the night-soil percolating through leaky privies, foul the air round the houses.

To add to these nuisances from within the house, ignorant people, by throwing rubbish all over the street, instead of throwing it into the dust-bin, by depositing decomposing stable litter in one or two dust bins which are often heaped up to overflowing and which are sometimes placed by the side of bedroom windows, by washing domestic animals such as cows, horses, etc., and vehicles such as rikshaws, coaches, etc., in public streets, by washing soiled and dirty linen and scouring household utensils and sometimes by bathing near the public tap from which they often draw their daily water supply, by keeping cows and buffaloes in the streets, by using side drains as latines, by depositing silt by the side of the drain, by spitting indiscriminately both inside and outside the house, foul the air of the street outside the houses. Such streets instead of bringing draughts of fresh air into the houses abutting on them, serve as store-houses for decomposing matter and help slowly but steadily to poison and undermine the health and constitution of the people in these houses

The Conservancy Problem.

The Domestic Rubbish Bin

[BY DR S ISAAC, ASSISTANT HEALTH OFFICER, CORPORATION
OF MADRAS]

SANITARY Installations, like everything else, follow the law of evolution. Ditch drains and cement drains must, at a certain stage in the development of a Municipality, give room to sewers, sanded and masonry latrines will eventually have to be replaced by the more sanitary W.C. The public dust-bin, whether fixed or moveable, plays a useful part in the evolution of Municipal sanitation, but it ceases to do so sooner or later. As a Municipality increases in complexity and congestion, efficient removal of household rubbish becomes as important as that of nightsoil or sewage. It is unfortunate that this aspect of the question has not been sufficiently realised by authorities who spend large sums of money on sewage and other works. Sufficient attention has not been paid to the proper removal of rubbish. Consequently, public health is affected in various little ways. Nobody who has sufficient experience with the public dust-bin will hesitate to endorse the writer's views that the evils arising out of an improperly used bin are more dreadful than the blessings which it is supposed to bestow and that most public bins are improperly used. Increasing dust-bins and placing them at shorter intervals have been found to give no better results. And this is hardly to be wondered at. It is scarcely fair to expect a respectable Indian lady to go across a street with her plate-leaf or a basket of rubbish to a yonder bin, especially at night. The sense of cleanliness (and it may be sentimental) is so much ingrained even in less respectable ladies, nay servants, that they feel a zone of contamination round a bin, with the result that the rubbish is at most thrown outside it! The bin and its surroundings are always but a mess of rubbish and ashes, made more hideous by fowls, dogs, cattle and children. The moral effect of such surroundings,

especially on growing children, is most depressing, while the contaminated subsoil, often mixed up with surreptitiously stored up nightsoil, gives out a perennial fragrance to the residents all round, especially to the man under whose nose the bin is kept. It thus perpetually supplies the atmosphere with filthy dust particles not infrequently laden with infectious matter. It attracts the ubiquitous fly and through it spreads contamination to foods and drinks. In a Municipality of a moderate size where congestion demands a heavy toll of death-rate, the public dust-bin causes untold miseries and ceases to be a blessing. It vitiates the atmosphere and through flies and high winds contaminates foods and drinks. It thus contributes not a little to the high death-rate. It, therefore, ceases to be a sanitary equipment for domestic rubbish, although it may still serve its purpose in high ways for what is called accidental rubbish. Even from a financial aspect, the rubbish bin is not a desirable thing, for it entails a large establishment of coolies and carts and considerably retards the conservancy operations.

As a Municipality grows in size and complexity, its constituents have to realise their responsibilities to the Municipality and to learn to co-operate with its authorities. This co-operation is all the more necessary with regard to the removal of waste products, viz., nightsoil, sewage, offensive matter and rubbish. The abandonment of the public rubbish bin involves public co-operation which consists in the individual storage of rubbish in one's own house till the conservancy carts arrive. The rubbish of a house is collected in a box, basket or a tin and placed outside morning and evening when the conservancy cart arrives and removes the contents. In Europe and other advanced countries, this co-operation is legally enforced without trouble and the conservancy problem, so far as the removal of rubbish is concerned, is easily solved. In Bombay the public dust-bin is said to be dispensed with. When this system was introduced in Madras last year, a storm of opposition was raised. The writer who was closely

associated with this system, has since studied the problem very minutely and has come to the conclusion that a wholesale adoption of any European Institution in India is undesirable, unless accompanied by such devices as will meet the special customs and habits of the people. The objections raised were —

(1) Caste and sentiment which revolt against storage of used-up plate leaves inside a house and against handling of a basket or tin touched by scavengers

(2) Sanitation of the house at the risk of street insanitation

(3) Enormous inconvenience caused by not promptly attending to the call of scavengers

(4) If the basket is permanently kept outside,

(a) Cost of constant renewals due to thefts,

(b) Insanitation of the front portion of the house, which corresponds to the drawing room of a bungalow, rendering it ominous and abominable, especially in rainy weather

Thus the objections are sanitary, sentimental, socio-religious and pecuniary. There is no use arguing about them. We must take the people as they are and devise means which, while meeting their objections, satisfy the sanitary requirements. An ideal domestic bin should, therefore, possess the following characteristics —

1 It should be immovable

2 It should be fixed in a place quite handy to the users and at the same time be easily accessible to scavengers, *i.e.*, in the front part of a house in most cases

3 It should have a door which, when not used, should be kept tightly closed to prevent effluvia rising and flies haunting

4 At the same time it should be opened easily without touching any parts which come in *direct* contact with the rubbish and plate-leaves

5 It should have a separate door for scavengers, facing the street

6 The drawing room aspect of the front part of a house should be maintained so that the dust-bin may not be an eye-sore to visitors and friends

7 The removal of the contents by scavengers should be as neat and as quick as possible

It will thus be seen that the difficulty of devising a proper bin is enormous. The writer was at considerable pains in solving the problem. He adopted the existing patterns and improved on them. He devised various other patterns but they were all found to be defective in some respects or other and could not be brought into use. The problem appeared for some time hopeless of satisfactory solution. But perseverance combined with confidence has its own reward. After considerable thought and energy, the device which is described below and which looks so simple now, has been invented and it may be noted that it satisfies all the requirements of an ideal bin to a remarkable degree. The bin has been named by the writer the "Sanitobin."

The "Sanitobin" consists of two doors, wooden or iron, preferably the latter, fixed in the recess of a wall, the recess acting as a receptacle. The lower door ($1\frac{1}{2}$ ft x $1\frac{1}{4}$ ft or less) is for the scavenger, faces the street and is fastened by a latchet. The upper door is a specially contrived flap-door ($1\frac{1}{2}$ ft x 1 ft) which carries two quarter-circular side wings (10 inch radius) of plate iron and hinges on a horizontal plane. When closed, it lies flush with the wall and when opened, it juts out like the jaw of an animal. It opens by foot-level arrangements and closes automatically when the foot-pressure is relieved. The lateral wings are connected at their free extremities by a rod which carries sufficient counter-weights or in a chainless variety, one or two coupling rods which are attached to the foot-level at their lower extremities. The wings are also connected about the middle of their upper curvature by a second rod which limits the forward movement of the door,

being checked by a moveable pin attached to the door frame above. When the pin is moved out of the way, the whole door can be swung out, cleaned and painted. In the chainless variety, however, the door cannot be swung in this way, without previously detaching the coupling rods. The settling of rubbish on door sill is prevented by a deflector which is a plate of iron (6 inch wide) stretching between the wings and is fixed at an inclination of 30° to the wings and the door. The depth of the door being about 1 foot, the bin can be accommodated in the thickness of a wall, whose usual thickness is 1 ft 3 in. If the wall is thinner as in a parapet wall, a projection is given in front or behind or both ways, without destroying the æsthetic appearance of the house. On no account should the architectural appearance be tampered with. This is important. The dimensions of the bin are $2\frac{1}{4}$ ft x $1\frac{1}{2}$ ft x $1\frac{1}{2}$ ft with a capacity of about two kerosine tins. The capacity can, of course, be increased or decreased by altering one or other of the dimensions. The interior of the bin should be smooth, corners rounded and all crevices and ledges obliterated. The foot level is fixed in the floor so as to be flush with it, the lever working in a groove. Thus an ugly projection of the lever is avoided. Best results are obtained by providing a drawer-like dealwood box inside the recess which facilitates the work of an erratic scavenger. For this purpose a ridge ($1\frac{1}{2}$ inch) runs round the interior so as to overlap the edge of the box in order that the rubbish may not fall between the wall and the box. There are two varieties of sanitobins, (1) one with a chain and (2) the other without it. The latter can be fixed in houses with a basement of 2 feet or more. There are three positions in which the upper door can be fixed, according as the upper and lower doors are on the same plane, on opposite planes, or on planes at right angles. The bin may be installed—

(I) in any wall which faces a street or a street on one side and a compound, kitchen, latrine, bath room, &c, on the other side,

- (2) in a parapet wall of front verandahs and,
- (3) in reclining and plain pials or masonry benches common in most Indian houses

In fact, it may be fixed in any part of a house without destroying its architectural beauty. The cost of the masonry work comes up to Rs 3 to 5, that of the doors varies from Rs 7 to Rs 10 according to the thickness of the iron plate used.

In conclusion, several "sanitobins" have been already installed in Madras, one of them has been working for over five months and has given entire satisfaction. The bin requires very little attention. Weekly rinsing with water and occasional painting inside with tar is all that is required. Brahmans as well as non-Brahmans have taken to it. To sum up its advantages—the bin is simple in its mechanism, handy and compact, self-closing, intramural, sanitary and protective against that deadly insect, the fly. It is cheap and it need not be touched by hand at all. *It satisfies the sanitary requirements of the sanitarian, the religious scruples of the orthodox, the social susceptibilities of the Indian lady and the purse of the Indian poor man.* In fact, it answers all the objections hitherto advanced against private receptacles for household rubbish. Such a bin should be regarded as an appurtenance of a house as much as a latrine or any other sanitary equipment. It is high time that this principle was recognised and adopted in Municipalities which are threatened with conservancy problems.

Secretary or Manager?

[BY A MUNICIPAL SECRETARY]

IT is a general belief that the appointment of a Secretary to a Municipal Council has not proved a success and consequently it is urged on all sides that advantage may be taken of the revision of the District Municipalities Act to

do away with the provisions that empower Councils to make such an appointment

In the case of the appointment of a paid Chairman also, there has always been a clamour not only at the time of the introduction of such an appointment but also subsequently, the cry being to do away with him at the end of the term of his office

Those who denounce both the appointments not only count upon financial savings but also upon harmony which is wanting now between the Secretary and the Chairman in the first instance and the Chairman and the Council in the second instance

On an examination of the broad facts that lead to the frequent instances of rupture between the Chairman and the Secretary, it would be seen that the causes that led to such were due to the ill-defined powers and duties of the Secretary and to the supposed dual control to which the establishment and the administration were subjected. It will be readily accepted that such a dual control, if ever it existed, was more dangerous and prejudicial to the administration. The Act, Section 39 A (3) (d) is as vague as possible and the departmental instructions issued by Government (vide page 375 of Hammick's Manual) are equally dubious. Not infrequently the cause of disagreement between a Chairman and a Secretary is the appointment or retention in service by the latter of a person whom the former does not want. If the latter persists in his views, he has sown the seeds of dissension on a very fertile soil and the Chairman leaves no stone unturned to create slyly a public opinion, at least among the Councillors and the local administrative officers, the Collector and the Revenue Divisional Officer, against the delinquent Secretary. Or, in the matter of administration, an exception to a course of conduct pursued for sometime, in favour of an individual by the Chairman may rightly form the cause of disagreement between him and the Secretary. The check-mated Chairman is at his wits end when his purpose is thwarted.

and works his very best to make the imprudent Secretary rue the moment when he relied too much upon his sense of justice

So the causes that lead to the Secretary's appointment proving a failure are inherent in the enactment itself. For good or bad, the administration should be in the hands of one person. If a Chairman with sufficient time at his disposal, and with capacity and tact, is available, there is no need for a paid Secretary. If otherwise, a full-timed officer, whatever he may be called, to steer clear of the administration, attending to the very many minute details seems necessary.

As regards the paid Chairman, it is stated that it is a slur on the Council that an outsider should be thrust in and that, on financial consideration, the Councils should be relieved of such burden. Paid Chairmen are appointed only in big Municipalities. Leaving apart all other considerations, a highly-paid full-timed officer is necessary to manage an institution of the kind and it would be an administrative blunder to have matters in the hands of a highly-paid Manager. What would be the result? The highest scale provided for a Manager (G O No 1592 M dated 22-8-14) is Rs 80 to 120. It will be admitted on all hands that one who is to be chosen for this office should have a good experience of office routine and also some administrative capacity, for if he were not capable, the Non-Official Chairman, who is not expected to know, or much less to scrutinize, the administrative details and who, after all would spare an hour or two to look into important papers, would be misled and his administration brought into contempt. Generally therefore the staff of the Collector has to be looked to for recruitment. If so, what kind of men can be had for the pay offered? Those who have a chance of being made Deputy Tahsildars will hardly think of entertaining even a remote idea of entering Municipal service on this pay. It is therefore men who have not such a chance that will be available. What then would

be the capacity or character of such men? They must be persons whose prospects have been blighted either by pronounced incapacity, dishonesty or want of sufficient educational attainments to fill up the office of the Deputy Tahsildar. It is therefore a question that has to be seriously considered and dispassionately answered,—whether the administration of a big Municipality can be entrusted to such men if the Government have thought fit not to entrust them with responsible duties. Whatever may be the zeal or desire of the honorary Non-Official Chairman, he has to depend entirely upon the Manager for all routine matters and for details in connection with the important questions on which he has to form an opinion. A negative answer to the above question is what could be expected from every one who has given this subject an unbiased consideration. If so, the next question would be what would be a more satisfactory method of carrying out the administration?

In the case of larger Municipalities, which in this Presidency may be about two dozen, the administration should be conducted by a paid full-time officer, with sufficient experience of Municipal administration to be nominated by Government, his tenure of office running to at least five years. In the matter of administration he should be left unfettered by the Council who are at liberty to dictate the policy to be pursued by him in the administration, leaving the details of working to his discretion. Such a system would be analogous to the one prevailing in Bombay and will result in educating the Municipal Councillors in civic matters or at least will set their minds at thinking as to what best can be done to improve the civic life of the place and to give them opportunities to study and criticize the policy pursued. It may be argued that even under the present Non-Official Chairmanship facilities are not wanting. In answer to this, every one who is either a Municipal Councillor or a Non-Official Chairman has only to put the question to himself, "If the acts done at present in the name of the Council are not one man's act and the policy

pursued, one man's policy, which is tacitly assented to by others " Wherever there are any questions raised by thoughtful and interested Councillois, dissension is seen to spring up, if the spirit of enquiry, criticism and discussion is sustained for any length of time

To secure competent men and to ensure their continuance in service for any appreciable length of time (for it will be a bad policy to have constant changes in the personele of the administrative head, unless it be on account of proved incompetency or dishonesty), not only should the pay be attractive since the service is non pensionable and since there is not the same chance of continuity of service as in the case of Government servants, but also the tenure of office should be made to run for five years and should be eligible for re-nomination, should nothing appear against him If such attractions are not attached to the office, it may not be inviting to the kind of men who would be found both competent and willing

In conclusion, call him a Secretary or Chairman, a paid full-timed officer is an absolute necessity to manage the complex machinery of Municipal Government, which is rendered more and more complex by the numerous additions to the duties of Municipalities, as an Honorary Chairman, however gifted he may be, will be physically unable to keep pace with all the work, unless relieved by a competent assistant If that assistant has to be paid more than what is proposed now (80 to 120), why not have a full-timed officer and keep on a continuous policy of the administration instead of changing it with every new Non-Official Chairman that may be elected once in three years The Council as a body can formulate the policy to be pursued and the chances of it being radically changed are far less than in the case of change in the personele of the Non-Official Chairman The supposed savings that may result from the appointment of a highly paid Manager instead of a Secretary or a paid Chairman is therefore illusory and at considerable risk of efficiency As regards harmony between the chief administrative officer and

the Council, there is no chance of any serious disagreement as he has to simply carry out the policy unciated by the Council, who with this responsibility on them will certainly weigh the *pros* and *cons* in consultation with their Executive Head of the administration before they introduce any new policy. It should at the same time be understood that there is no interference of the Council with the administrative work of such officer.

The full-timed officer so appointed should be looked upon as an expert adviser to the Council in the matter of administration and as one who manages their work on their behalf and in accordance with their wishes. If such a spirit is engendered, the chances of friction between him and the Council are likely to be at a minimum. Those who deprecate the paid Chairmanship but advocate Non-Official Chairmanship, will do well to take a census of men in each Municipality who are willing to devote themselves as full-timed officers, care being taken of course to see that such men have sufficient official experience and the energy and tact to conduct the administration smoothly. In places like Madurai, Trichinopoly, Tanjore, Negapatam, Kumbakonam, Salem, Coimbatore, Calicut, etc., if such men are available in sufficient numbers there will be no justification for wasting rate-payers' money on the luxury of a paid Chairman or a Secretary. Otherwise a full-timed paid Executive Officer alone at the head of the administration can adequately meet the demands of the present day.

Civic Education.

WE reproduce below an extract from an interesting letter received by us from Mr E. L. Burchard of Chicago, which describes some of the methods adopted in Chicago for aiding public schools and civic centres to wider use of civic educational resources. All sorts of experiments are tried in this country with regard to the system of

education in schools and the question of moral and religious instruction has long been a perplexing problem. But no care seems to be taken about civic instruction in schools. Instruction in civics, hygiene and sanitation is, it seems to us, more important than instruction in other subjects. Half an hour devoted everyday to unparting lessons in personal and domestic hygiene will be far more valuable from the community point of view, than hours spent in explaining the religious dogmas of the diverse sects of Hinduism. Cleanliness, it is said, is next to godliness.

"It should be borne in mind that American public schools are rapidly becoming more and more the community centres of their neighborhoods. In Chicago for example, over 100 of the 300 schools are now being used as polling places for elections. Many of them are social recreational centres and the play centres of their neighborhoods. We expect to see them become in time, local public health offices and local social service headquarters.

There is every reason to hasten development of a local neighborhood legislature in each of these school buildings where the people of the district can discuss public policies just as they have been doing for two hundred years in the little town meetings of New England. More and more the Swiss method of referendum is being employed in our municipal and state affairs. In other words, we put up to the people on our ballots, questions involving the expenditure of money that they must vote upon to decide whether they wish to pay the necessary extra taxation. If we furnish them a place to vote in the school house, we certainly should furnish them a place to discuss beforehand, the questions involved in the vote on these matters of public policy.

The difficulties in an urban community like Chicago, is the cosmopolitan character of the people. The high school district of which I am civic secretary for example, is composed principally of Polish, Bohemian, Swedish and German people, a large portion of whom are not able to speak English. Here

is the difficulty. We are trying to get around this by the organization of our Community Council on nationality lines, each foreign speaking nation being represented by five members on our council. They help us to reach the foreign population here and to give our meetings publicity and they act as a go-between with the churches, fraternal clubs and other organized groups in their respective nationalities. They all seem glad to work together for a high common and civic purpose that aims towards the benefit of their own community. We used last year, speakers in different languages on our programs, but this year we are using only English speakers. We depend upon projection pictures, motion films and lantern slides to help us interpret. We put on entertainment features, such as music, folk dances, etc., in order to make the meeting attractive to a great many who would not come to a purely educational evening.

Our work with the children in the schools in connection with their history and civics, is to lay stress on knowing the social and civic resources of their own neighborhood. This makes quite a different thing out of civics than the formal rote teaching of laws and constitutions. They are interested in their homes and the relation of their homes to the surrounding neighborhood and city institutions. They enjoy making pictures, maps and other exhibits of their neighborhood civic resources. When they become voters, they understand better that it is important they should take part in civic life as a matter of self-interest, as well as for higher motives. This, we think, will go a long way towards overcoming the apathy of the municipal voter, which has been one of the most serious drawbacks of our city life. In times of excitement it is easy, of course, to secure the activity of the citizens, but naturally what is wanted is the constant interest of all in public affairs."

In drawing the attention of the Indian Municipalities and Local Boards to the above extract, we may express the hope that they would consider the desirability of introducing civic instruction in Municipal and Board Aided Schools.

Burma Municipalities.

Appointment of Officers

THE Burma Gazette of February 19th, 1916, contains the rules which have been made by the Lieutenant-Governor prescribing the qualifications requisite in the case of persons appointed in Municipalities in Burma to offices requiring professional skill

These rules relate to posts of (1) Municipal Engineer or Superintendent or Overseer carrying a monthly salary of Rs 100 or more, (2) Schoolmaster or Schoolmistress carrying a monthly salary of more than Rs 50 or Deputy Inspector of Schools, (3) Municipal Health Officer, (4) Sanitary Inspector on a salary exceeding Rs 50, or Vaccinator or Native Superintendent of Vaccination, (5) Sub-Assistant Surgeon, Compounder, Midwife or Nurse, or to the charge of a Municipal dispensary or hospital

Appointments to any of the above posts are subject to the approval of such Government officers as the Chief Engineer, Burma, District Executive Engineer, Director of Public Instruction, Sanitary Commissioner, and Inspector-General of Civil Hospitals

These rules, however, do not apply to appointments in the Rangoon Municipality

We consider the rules retrograde and not calculated to advance Municipal Government on self-governing lines, at a time when the policy is to let local bodies do as much as possible themselves. If the rules had prescribed actual educational and other qualifications for some of the bigger posts and allowed the municipalities to appoint persons only with such qualifications, we should have had no quarrel. But the rules as they stand at present do not ensure that competent persons only will be appointed to Municipal posts. There is nothing to prevent the Chief Engineer or the Executive Engineer foisting their favourites, however disqualified they may be, on unwilling Municipal bodies

We would, therefore, suggest that the rules be amended prescribing definite qualifications and leaving the selection of persons to the Municipalities. Government should have little or nothing to do with such appointments.

Public Health and Sanitation.

Enteric fever in Bombay

The need for prompt and more general notification *

THE two principal sources of information of the existence of typhoid fever are (1) the notifications received under section 421 † and (2) the returns showing the number of deaths from this disease. Figures dealing with both these sources of information are given in the following Tables —

Table A

Year	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914
No. of Deaths	60	62	89	45	55	60	184	116	111	92	156	145	152	154	147
Mean = 105															

Table B

Year	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914
Medical Practitioners	..	25	46	114	115	64	71	76	71	101	170
Hospitals	0	1	12	0	2	1	1	5	6	26	46

Table C

Year	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914
Notifications	25	47	126	115	66	72	77	76	107	196	172
Deaths	55	60	184	116	111	92	156	145	152	154	147
Mean Deaths = 110											

From Table A it would appear that enteric is on the increase in the city. For the 15 years (1900-14) the mean annual number of deaths was 105. In this period, seven years were below the mean, (*viz.*, 1900 to 1905 and 1909). The other years were above the mean.

* From a Report by Dr. Turner, Executive Health Officer, Bombay.

† Section 421 of the Bombay City Municipal Act reads as follows —

Every medical practitioner who treats or becomes cognisant of the existence of any dangerous disease in any private or public dwelling, other than a public hospital, shall give information of the same with the least practicable delay to the Executive Health Officer. The said information shall be communicated in such form and with such details as the Executive Health Officer, with the consent of the Commissioner, may from time to time require.

It is very doubtful if this apparent increase is a real one. In the first place there is little doubt but that the alleged immunity of the Indian from enteric was not based on fact, and that the so-called Bombay Remittent Fever was in fact enteric. It must be remembered that enteric until comparatively recent years was a disease somewhat difficult to diagnose and in fact it still is in the earlier stages. The establishment of well-equipped up-to-date chemical and bacteriological laboratories in various centres has unquestionably given much greater facilities for diagnosis than formerly existed and has enabled the modern practitioner to more often avoid the easy but somewhat indefinite diagnosis of "Fever."

Apart from the facilities given for diagnosis and the wider range of knowledge of "Fever" now possessed by practitioners, there is evidence of an increased desire of the medical profession to comply with the requirements of the Municipal Act in regard to notifications, but it must be remarked that even yet there is a considerable tendency to evade this obvious duty to the public.

There are fewer notifications of enteric than there are actual deaths from the disease and less than half the actual number of cases that occur are notified. This cannot and is not due to any ignorance of the obligations imposed by law on medical men as all have been repeatedly circualised and then attention drawn to the section of the Act concerned (Sec. 421). Both in this and other diseases, it appears that more vigorous measures will be necessary to enforce compliance with the requirements of the Act.

Ample evidence exists of the spread of enteric owing to failure to recognise the disease, and this failure is specially conspicuous in the case of children who are often erroneously held to be insusceptible to enteric.

An overlooked or unnotified case may be the source of many others as the disease has a fairly high infective capacity, especially where a number of people are gathered into one

house. The main object of notification is to enable adequate precautions to be taken and such are essentially necessary in a city where the system of water carriage of excreta is still in its infancy

Given an overlooked or unreported case of enteric in a house provided with basket privies in dangerously close proximity to dwelling and cook-rooms of the same or adjoining houses, many facilities are given for the conveyance of the bacilli to exposed articles of food also by means of flies

It will be seen from the following statement that the number of cases of enteric admitted into the hospitals in the city during the last five years was 642, the actual number of cases that occurred must have been much larger, while the number of cases notified was only 544

	No of Enteric cases treated in Civil Hospitals in the City	No of deaths among those treated in Hospitals	No of notifications received from private medical practitioners
1910	115	54	78
1911	183	45	71
1912	125	37	101
1913	121	33	170
1914	148	43	126
TOTAL (1910-1914)	642	212	544

Cases treated in private houses under conditions which exist in India more readily spread the disease than those treated in hospitals, while convalescents may also readily convey the disease to others, and act as what are known as "carriers"

The House Fly

The house-fly is the chief carrier of disease microbes, and is the indirect cause of most of the diseases in man and his domestic animals. One of the chief causes of spread of epidemic in India, such as Cholera, Typhoid fever, Dysentery and other diarrhoeic diseases, is due to house-flies. The house-fly breeds in filth of the foulest nature. The mouth part of the house-fly is constructed for sucking purposes and it is unable to bite or puncture our skin. The six feet of the

house-fly have each two claws, and in addition there is on the feet of it a soft pad thickly covered with fine hairs which secrete a substance which enables the house-fly to walk upside down on upon highly-polished surface, such as window panes. The entire body is covered with coarse bristles giving the magnified body of a fly the most repulsive appearance. The fly is provided with an acute sense of smell

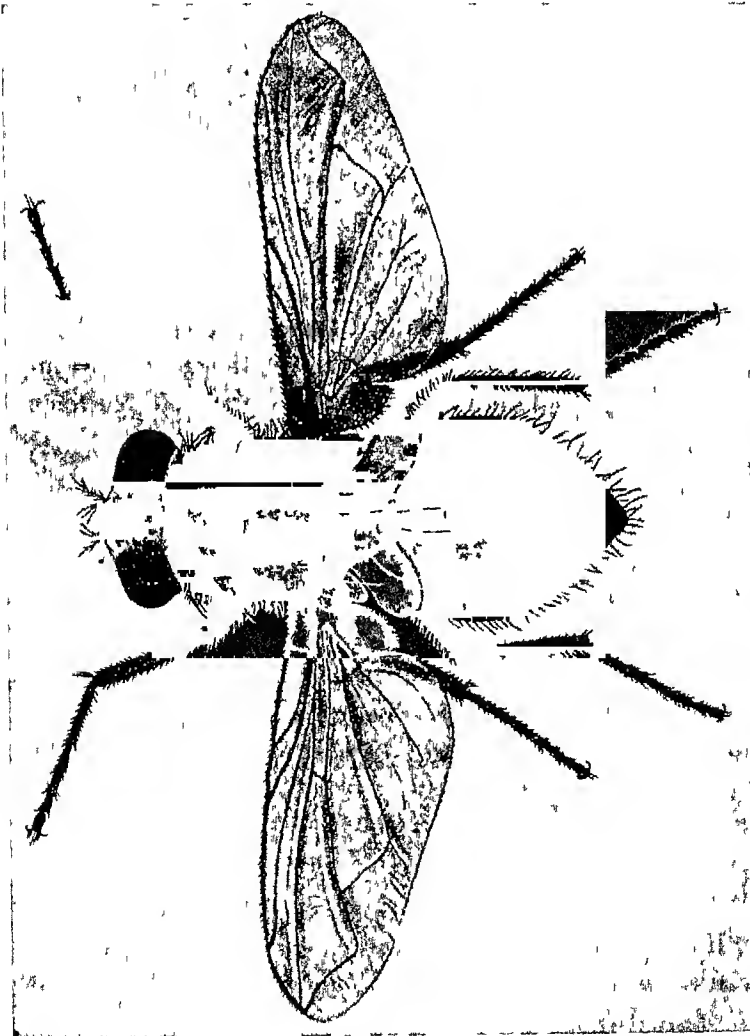


Illustration by courtesy of THE CHRISTIAN LITERATURE SOCIETY FOR INDIA

THE HOUSE FLY

and decaying vegetable and animal matter has an irresistible attraction for it. It sits upon all kinds of unmentionable filth and greedily feeds on it. If it is a female desirous of laying a batch of eggs, she burrows into the heavy microbe laden mass of filth, such as house refuse, sewage, horse and cow manure, etc., and after carefully depositing her precious eggs, she wings her way to the nearest dwelling house to seek shelter from the wind and rain and to sample the food-stuffs of the dweller of that house. A single house-fly is capable of carrying many millions of microbes of any disease upon it without any inconvenience. If the filth on which the fly has been feeding is infected with disease germs, then the host of these terrible destroyers of human life, stick on to the sticky pads on the fly's feet, and its large soft proboscis, its legs, wings, and bristles. We know how house-flies swarm over the food-stuffs, drown themselves in our milk, soup and tea and sometimes get mixed up with our food. Therefore knowing how the fly becomes covered over with the microbes, any child can understand how the microbes are transferred to our food and drink.

Whenever a fly sees any phlegm coughed up and thrown by the side of the gutter or road, it swarms round it and on it. After walking through the phlegm and swallowing portions of it, the fly enters the nearest open window or door and then finds its way for the food-stuffs in the kitchen, dining room, etc., infecting them with microbes of disease. From there they make excursions to various dust bins, the decaying carcase of animals, privies, latrines, pig-styes, foul expectorations and excreta of animals on the road side, etc., and wing their way back and infect the supply of food in dwelling houses. House-fly carries the germs of disease not only on the outside of its body but also inside it.

Its body is thickly clothed with hair and its legs resemble miniature brushes, from which no cleaning or washing will remove the disease germs when once they are contaminated with them. Therefore flies which have come into contact with

disease infected filth, will contaminate whatever substance they subsequently visit within a certain length of time. It has been proved that germs which bring on Typhoid fever were found on the body of the flies 23 days after they had been infected. It has also been found that Typhoid germs remain alive in the intestines of the fly for 6 days after feeding upon the infected substance. The fly also takes disease germs into its system when feeding on filth and distributes them in its excreta and vomiting which it regularly practises as part of its regular digestive process. It has also been shown that the fly deposits excreta 3 to 7 times per hour and vomits 6 to 15 times per hour, the rate of both depending upon temperature and food. Imagine the danger of eating food-stuffs contaminated with the germs of disease carried by such inoffensive looking things like flies. It is why we advise that all food should be protected by keeping it in fly proof safes and under cover.

Further the fly lays its eggs in filth. It prefers to lay its eggs in human excreta, horse and cattle dung, and droppings of sheep and goat. Each fly lays about 150 eggs at a time and lays eggs about once a week. I leave it to you to imagine what an army of them will come into existence in a few weeks. So, to prevent fly breeding, no accumulation of dirt should be allowed near our houses or in the compounds, or backyards, drains, latrines, etc. All excreta and dirt should be deposited in covered buckets and later on be either promptly removed, buried deep at least 2 feet below ground or burnt, if possible.

You will see how much you will gain by keeping your houses clean.



Rules for combating epidemics of cholera in Municipalities

It is now a generally accepted belief that the infection of cholera is conveyed by microbes which exist in the vomit and excreta of persons attacked thereby. The present rules provide for the immediate destruction of these microbes. Should they remain undestroyed, there is imminent risk that they may be conveyed into positions in which they will be swallowed by other persons and so infect them with the disease, for rain would wash them into drinking-water supplies, and the wind and flies and other insects would carry them into articles of food.

It is the object of these rules to ensure that the earliest possible information of every attack of cholera should be conveyed to the authorities. This will enable them to prevent the spread of the disease, by taking steps to destroy the microbes issuing from such early cases and by providing medical assistance and means of disinfection.

Municipal Councils shall be responsible for the general carrying out of this scheme. In municipalities where a Health Officer is employed, the Health Officer shall be responsible for the necessary medical arrangements, in municipalities where there is no Health Officer but a Civil Surgeon, the latter shall be responsible for these arrangements, in all other cases whether in district head-quarters or elsewhere, District Medical and Sanitary Officers. The preventive staff referred to in rule 13 below shall work under the Health Officer, the Civil Surgeon or the medical officer designated by the District Medical and Sanitary Officer to carry out necessary arrangements or, in the absence of such designation, under the Senior Medical Officer on the spot as the case may be, while the observation staff mentioned in rule 8 shall work directly under the Chairman.

* Rules framed by Government in accordance with sub section (1) of section 256 of the Madras District Municipalities Act, 1884

For the purposes of these rules every municipality to which they apply shall be divided into "circles" which should, as far as possible, follow ward divisions, so that they may be readily comprehended. In municipalities where there are wards containing less than 1,200 houses and a population of less than 5,000 persons each, two or more wards may be comprised in one circle. Three circles shall ordinarily form a division, and in no case shall a division contain more than four circles. Chairmen should map out their towns into "circles" and "divisions" and after approval by the Collector record the maps in their offices, sending copies to the Health Officer or to the Senior Medical Officer of the municipality.

For each division the Chairman shall at once procure and retain in the municipal stores not less than the following quantities of apparatus and disinfectants, he is responsible for seeing that these stores are always in stock and that they are in good condition —

Twelve portable tin canisters for disinfectants

Nine lb perchloride of mercury

Nine lb commercial hydrochloric acid

Sixty lb carbolic acid

Six hundred lb of saw dust and 600 lb of unslaked lime

Observation — Should it appear to the Collector of the district that cholera imminently threatens to attack any municipality to which these rules apply, he shall warn the Chairman of the Council, the Health Officer, if any, and the Civil Surgeon or the District Medical and Sanitary Officer and the Senior Medical Officer of the town accordingly.

Upon receipt of such warning or of information from the Tahsildar, Deputy Tahsildar or village officer or otherwise of the occurrence of cholera so near the town that it is imminently threatened, the Chairman shall immediately appoint an observation staff which shall consist of not less than an inspector, a peon and a tota for each circle and of a divisional inspector and an orderly for each division. The orderly should be allowed a

jutka pony or other means of conveyance, to enable him to carry orders without delay. The Chairman shall at once report to the Collector the staff employed and the date from which it has been employed and shall comply with any instructions which the Collector may issue on the subject.

Note —The salaries and allowances of the staff should not ordinarily exceed the following rates which in the case of circle and divisional inspectors should be granted only to certificated or qualified sanitary or assistant sanitary inspectors —

	RS
Circle inspectors	35
Conveyance allowance	15
Circle peon	8
Circle total	7
Divisional inspector	45
Conveyance allowance	15
Orderly	8
Jutka or pony allowance to orderly	7

The staff may include or consist of competent temporary hands, if available. Otherwise it should be drawn from the existing sanitary establishment of the municipality, whose local knowledge will be valuable. In the latter case, the vacancies so caused should be filled by temporary hands who should be paid at the rates sanctioned for the establishment.

It will be the duty of the members of the observation staff to constantly and systematically patrol the whole of their circle and get early information as to the first case of cholera or severe diarrhoea occurring therein, in order that immediate action may be taken. At such times, cases of severe diarrhoea should be considered to be as dangerous as cholera. The members of the observation staff should also be employed in removing, with the aid of the ordinary conservancy establishment, all defects in sanitation which would favour the dissemination of the cholera microbe.

They should further warn the inhabitants of the circle to adopt the precautions against cholera prescribed in the extract from Surgeon Lieut.-Colonel King's "Simple Sanitary Rules" which is printed as an appendix to these rules and should

distribute gratis and as widely as possible copies of these instructions which the Chairman will keep ready printed in the vernacular

The Chairman, councillors and municipal servants of all ranks should assist the observation staff and police in every way which is compatible with their other duties in getting information of first attacks and in removing sanitary defects in the circle

Prevention of infection—On receipt of information of a first attack of cholera the Chairman shall at once convert the observation staff of the circle concerned into a preventive staff by the addition of three peons and three totis or such other establishment as the Collector in consultation with the District Medical and Sanitary Officer shall consider necessary

The preventive staff shall visit every house in which cholera has occurred and shall use the greatest care in seeing that all choleric vomit and excreta are at once collected, mixed with carbolic saw dust, paddy husk, or other combustible matter and, where necessary, with kerosene-oil and burnt on or near the premises. The Chairman shall delegate to the Health Officer or Senior Medical Officer of the town and to any other persons who may have to act under this rule his powers of entering and inspecting houses under section 231 (1) of Act IV of 1884

Rags stained with vomit or excreta should be burnt on the spot, full compensation in money or kind being offered in the case of the really poor, clothes and bedding may be boiled in disinfectants and returned

After a case of cholera the house (and especially the room which the patient occupied), the floors, the walls and the furniture should be thoroughly disinfected with a solution of perchloride of mercury made

$\frac{1}{2}$ oz perchloride of mercury
3 oz of hydrochloric acid
3 gallons (one small chattyful) of water with a pinch of red ink powder to colour it to prevent accidents

* One part of carbolic acid to ten parts of saw dust

up as shown in the margin. All drains which discharge into the open should be flushed with the perchloride solution.

Note — Wooden buckets or earthen pots should be used for carrying about this solution, as it destroys metal vessels, and the packets of the solid perchloride should be labelled "Poison" in English and the vernacular and only entrusted to the inspectors themselves.

It is most desirable that the excreta of a patient for at least ten days after he has recovered from an attack should be carefully collected, disinfected and carried away, as they still contain cholera microbes. For this purpose a Din digal bullock lorry and an iron excreta drums may be provided, if the Council find their purchase necessary.

The greatest courtesy and consideration should be used to all classes by the preventive staff, when carrying out these instructions.

The Chairman shall provide the medical officer responsible for working the rules with a permanent advance of Rs 50 for each division, the advance should be recouped from time to time by bills supported by vouchers where possible.

The preventive staff shall be maintained in an affected circle for ten days after the last attack of cholera therein, and the observation staff shall be maintained in all circles or in such groups of circles as the Collector may approve for twenty-one days after the last attack in the town. During this time they should be employed in remedying sanitary defects.

Medical aid — There shall be a head-quarter in each division at which a medical subordinate shall reside who shall be supplied with medicines and medical comforts from the municipal hospital for the treatment of persons attacked. He will also be available for attendance free of charge on the sick in their own houses.

This shall also be the head-quarters of the division inspector and of the preventive staff on night duty.

In one place at least in each town there shall be isolation huts with separate accommodation for males and females for the treatment of those who desire treatment or who are brought there. These huts shall be in charge of a medical subordinate and staff and shall be supplied with equipment,

medicines and medical comforts The medical subordinate shall be deputed to no other duty He shall reside with his staff on the spot and shall be adequately housed

Charges for medical treatment under these rules shall be met from the allotment in the budget under the head "Grant 3 Hospitals and dispensaries"

The Head-quarters of the divisions and the sites for the isolation hospitals shall be at once selected and shall be marked on the maps referred to in rule 5 above

In order to make provision for meeting the charges under the portions of this scheme relating to observation and prevention, the Council of every municipality to which the scheme applies shall be required to allot in every budget under "Cholera charges" a sum which shall be in the proportion of Rs. 1,000 to every 25,000 inhabitants in the municipality This shall be called the "Cholera reserve" and shall not be spent upon any object except the carrying of this scheme into execution

The provision of this reserve should not be allowed to disturb the existing percentages to the total municipal income of the expenditure upon communications, education, sanitation, etc., or to swell the total of the allotment made for sanitary purposes under Grants 1, 3 and 4 taken together, but should be set aside from funds which are at present annually expended upon sanitary works of a permanent nature

The Health Officer or Medical Officer responsible for working these rules shall, within seven days of the final withdrawal of the special staff, forward a report on the epidemic and the operation of the rules through the Chairman of the municipality to the Collector for the orders of Government In cases in which the Medical Officer in question is subordinate to the District Medical and Sanitary Officer or the Civil Surgeon, the report shall be forwarded through those officers All such communications shall be submitted to Government through the Sanitary Commissioner

[Extract from Surgeon-Lieutenant Colonel King's
"Simple Sanitary Rules"]

PRECAUTIONS TO BE OBSERVED ON THE APPROACH
OF CHOLERA

A —Habitations

1 Each house must be thoroughly cleansed, that is, all manure, dirty water, washings of cattle stalls and collection of dirt of any description must be completely removed

2 Where the earth remains damp and foul after such removal, it should be dug up till dry and clean earth is reached

3 The old earth should be taken far from the town and may be used as manure for the fields, new earth from a clean place should be laid down

4 The interior and exterior of houses should be whitewashed. If persons cannot afford to do the outside, the inside at least should be whitewashed

5 Bundles of clothing and other materials hanging from the beams, or occupying in any other way the rooms in which persons sleep, should be removed

6 Doors and windows should at all possible hours be left open, so that free ventilation be obtained

7 If private latines are used, they must be kept free from faecal matter by removal at least twice daily

8 The drains leading from houses should be cleansed twice daily

9 Cess-pools and pits for receipt of urine of cattle should be emptied daily

B —The Person

1 The body and clothing should be kept scrupulously clean. If delicate, person should use warm, not cold, baths

2 The food should be plain, nourishing and of good quality.

3 All vegetables or leaves, or fruits, likely to cause diarrhoea, should be abandoned

4 All forms of drinking to excess, debauchery, late hours and exposure to wet and cold should be avoided

5 Cold cooked food should never be used Care should be taken not to allow flies to settle upon food Vegetables and leaves should never be eaten otherwise than after cooking Before being cooked, they should be well washed in water that has been purified by boiling. Salt should be freely used with the diet, but, on the other hand, it must not be used in such unusual amounts as to excite uneasiness or looseness of the bowel

6 An inferior quality of water should not be kept in the house, only the cleanest available should be employed

7 Water for drinking purposes and for washing the mouth or eating and drinking vessels, and milk, should be boiled before use

8 No purgatives should be taken

9 Any tendency to diarrhoea should at once be checked by the taking of appropriate medicines, and persons having more than two motions in twenty-four hours should take this precaution

10, No fear should be felt, nor should the subject of cholera be constantly thought or spoken of



COMPULSORY EDUCATION IN MYSORE.

The following statement shows the Areas in which Elementary Education has been made compulsory
Date of Notification — 13th June 1914 and 22nd June 1915

No	Area	Number of children of school-going age (compulsory)	Number of such children already attending school at the time of Notification	Number of such children who have joined a school since Notification	Number of exemptions granted	Number of new schools established	Remarks
1	Mysore City	3,711	2,514	63		10	Will be opened very shortly
2	Nanjangud	318	222	98		1	The matter has almost reached the final stage
3	Seringapatam	440	260	72		5	and the Municipal President is being consulted
4	Bangalore City	3,120	2,010	772			
5	Dodballapur	635	449	138			
6	Chikmagalur	665	480	28			
7	Tumkur	913	670	52		2	
8	Maddur	304	213	54		1	
9	Hassan	465	347	54		1	
10	Hole Narsipur	498	380	117		2	
11	Kolar	851	579	97			
12	Chilballapur	543	443	18		4	
13	Shimoga	1,451	1,020	186			
14	Chitaldrug	521	396	62			
15	Devangere	1,057	667	96			
16	Gundlupet	306	157	25		1	
17	Mandya	304	182				
18	Channarayana	569	341				
19	Tarikere	489	296				
20	Burur	365	219				
21	Tiptur	213	127				
22	Arsikere	279	167				
23	Saklespuri	135	81				
24	Malur	318	190				
25	Sagar	291	174				
26	Tirthahalli	232	139				
27	Harbar	402	243				

Lists of children ready and Committees appointed except at Tarikere, Channarayana and Harbar

(a) The cost of the scheme is met from the provision of Rs 38,600 in the current year's Education budget

Street Lighting.

Arrangement of Street Lamps

A RECENT investigation of the relative merits of parallel and staggered arrangement of street lamps is most interesting, since it discloses that from an ornamental view point, the former is preferable, while, from an utilitarian view point, the latter is preferable under certain conditions. By parallel arrangement is meant the placing of lamps so that they come opposite each other, while staggered arrangement means that the lamps on one side of a street are placed so as to come half way between those on the opposite side. In general the staggered arrangement furnishes more uniform illumination. However, where the street width is not much greater than the distance between lamp standards, the parallel arrangement is preferable. In instances where the street width is considerably greater than the spacing of the lamps, the staggered arrangement will give the best results.—*Sc Amer*

Road Making and Maintenance.*

The Road Problem in Bombay

THE condition of the roads in the City is in many cases admittedly unsatisfactory. That this condition has been to a great extent inevitable is the more reason for taking steps to ensure permanent improvement. Before however dealing with these steps it is desirable to indicate some points on which the criticism that has been levelled against them is incorrect or is founded on insufficient appreciation of Indian or local conditions. Unless the difficulties which have in the past stood in the way of satisfactory roads and which will do so to a large extent even in the future, are recognized, neither the necessity for, nor the probable results of, the steps which are now proposed to be taken, can be fully appreciated.

* An abstract of a report, (which has more than a local interest) submitted by the Commissioner to the Bombay Corporation, on the desirability of appointing an Assistant Engineer for the care of Municipal roads.

The condition of the roads is, for instance, held to be wholly responsible for the nuisance of dust that occasionally occurs. In a place like Bombay where a high average rate of temperature is constantly accompanied by winds of greater or less strength, the presence of dust is to some extent inevitable. It can only be reduced by watering which, quite apart from the question of the general supply of the City, leads, if applied in excess, to other evils. Moreover, it is not generally recognized that however well the roads are watered, the open spaces, especially in a sandy soil like Bombay, collect large quantities of dust which are in time certain to be blown into the house and on to the roads. Those who complain of the dust in Bombay can have little acquaintance with the conditions in other Indian cities. A certain amount of dust is therefore almost as inevitable as the heat of the sun. Improved road surfaces such as tar painting, and road watering as often as is consistent with other considerations, have reduced the amount of dust and I have personally no doubt that it is now considerably less in Bombay than it was a few years ago. Entire freedom from the nuisance cannot, however, be expected.

Again, the introduction of motor traffic has affected the reputation of the roads in two ways. Firstly, there is the actual wear on roads which never previously took the heavy loads carried on motor tractors nor the high speed of the ordinary motor vehicle. Secondly, roads which were little used by the general public are now, owing to the greater range of motor vehicles, constantly traversed by people who had not the occasion to go so far afield before. However satisfactory it is that the roads are more widely used, it must be many years before roads which were constructed originally in the cheapest possible manner can be adapted to this traffic.

A great deal has been done of late years to extend the area of the roads and those who, living in Mahim or at Bandia had clear cause for complaint in the past, will find their needs fairly met by the construction of the roads which the Corporation have recently sanctioned.

Many of those who write about or criticize the roads are not hampered by any technical knowledge of the subject. Only those who have had to do with road work in Europe or who are obliged to study Municipal or Engineering Journals are aware of the difficulties that have been met in England and elsewhere in providing satisfactory road surfaces. The mere question of the slipperiness of the modern tar surfaces and their consequent danger to horses has caused much greater feeling and been more difficult to meet in England than it has been in Bombay. Moreover very large sums have been spent in England which are, as a general measure, beyond our standard of expenditure in Bombay. The Road Board in England has been placed, by special taxation, in possession of large sums of money, but the grants they have made have almost invariably been on the condition of equal expenditure by the local bodies to whom the grants are given. The Municipalities of all large Cities moreover have of late years spent great sums upon road improvement. It must be borne in mind that although the rate of house rent may be almost as high in Bombay as it is in London this is not due to the standard of Municipal taxation. The Municipal rates in Bombay are at a very low figure compared with those in Europe, and I hope that it will be possible to maintain them in this proportion. Those however who demand a European standard of Municipal administration must remember that it would entail an approach to the European standard of taxation.

The roads of Bombay have been made to meet the local traffic of the time or of the locality and have seldom any proper foundation. It is impossible to keep such roads when exposed to heavy traffic in adequate repair and their reconstruction though inevitable, and indeed in the long run economical, is necessarily a slow process. Moreover the material which has been found very successful in other countries gives rise to special difficulties in Bombay. The construction of roads with tar macadam and failing that with tar painting has been found most successful in European countries.

It has also been successful in Bombay, but with the excess of heat and moisture and with the effect of the dipping of road-side trees—a far greater necessity in India than in Europe on the roads—it is more difficult to keep the road so treated in good condition while the supply of tar is very limited and not easily capable of expansion. The supply of the ordinary road metal moreover is unreliable and often bad, and there are special difficulties as regards the staff.

There has not been sufficient provision in the past for road depots or for the provision of material.

The arrangements for the supply, cartage, storage, and control of road materials are still far from satisfactory. The system of forming heaps and measuring road materials on the roads and streets adjoining the works, in addition to the obstruction and annoyance thereby caused, opens the door to all kinds of abuse and leakage. It is impossible under such conditions to control either the quality or the quantity of the materials supplied. The remedy is obvious. Enclosed depots should be established in the several districts.

When the depots are in working order, all materials received can be weighed, examined and if of approved quality, prepared and stored. Then also will it be possible to see that the required quantities of materials are forthcoming before ground is broken and that the progress of work is not, as at present, dependent on the vagaries and caprice of the carting and supply contractors.

Further, the material issued can be passed over a self-registering weighing machine and the time and amount of the loads regulated. The rate of supply will also serve as a convenient check on the progress of the several works whilst substantial saving will be effected by depositing the road materials directly where and when desired on the works without double handling.

If the condition of the roads is still unsatisfactory, it is due partly to their defects being more largely exposed by the

expansion of traffic generally and particularly of motor traffic, and partly because the system is inherently defective

The introduction of mechanical transport will also effect much saving in time and expense, especially on long journeys

The great defect in the present system is the lack of adequate supervision. The staff employed on the roads is a very considerable one. There is a Superintendent of Roads with seven Inspectors and seven Assistant Inspectors. Under them there are 105 muccadums and 2,500 workmen. Labour on roads has always in all countries been liable to attract only the most unsatisfactory and most unskilled workmen and this has been the case even in England until the use of mechanical methods has necessitated the employment of well trained artisan foremen. In Bombay it has always been difficult to find men for the roads and it has been found recently necessary to raise the pay of those employed, so as to compete with other demands for labour. The present road staff costs the Municipality Rs 3,30,000 a year and it is quite obvious that they are not getting the worth of this money. This is due to the muccadums being drawn from the same class as the labourers and having little control over them. The Inspectors again have only a small amount of control over the muccadums and are themselves in constant need of supervision. The Superintendent of Roads does his best, but he has not the special training or qualification that is now required.

The considerable measure of success which has already attended the use of tar and bituminous surfacing, carpeting and macadam under the exceptionally trying conditions of temperature and moisture obtaining in Bombay, warrants a widely extended application of these methods of road formation and preservation. This class of works demands high technical knowledge and skill, as much depends on the correct proportioning and preparation of the various ingredients. The metal of chips must be carefully graded, the voids ascertained, the amount and kind of filler determined, and the

tar or bitumen regulated to suit each particular case must also be observed in drying the aggregate using the matrix at the proper temperature

Sewage Disposal.

Type-designs for sewage purification arrangement.*

The following designs for sewage purification arrangements, including septic tank, filter beds and sewage farm intended for the disposal of small quantities of sewage such as are collected from factories, police lines, etc., have been approved and issued† by the Sanitary Board (Madras) to local bodies for adoption

The type-design is for an installation for the biological treatment of 5,000 gallons of sewage per day. It embodies the most approved practice of the present day subject to the limitations imposed by the necessity for cheapness and simplicity of working in all sanitary measures intended for communities and institutions in this country

2 *Principles of bacteriological purification* — Some little knowledge of the biological action which effects the purification of sewage is useful as it will enable the man in charge to work the septic tank and filters all the more intelligently and efficiently

3 All sewage contains within itself the necessary organisms for its own purification. These organisms are of two kinds—anaerobic and aerobic. The anaerobic bacteria live and multiply in sewage in the absence of free oxygen, whereas the aerobic bacteria require free oxygen for their sustenance and growth. Sewage undergoes two changes when it is purified with the aid of these organisms. The first part of the process consists in the decomposition and liquification of the solid organic matters and their resolution into simple forms. The second part of the process consists in oxidation and nitrification

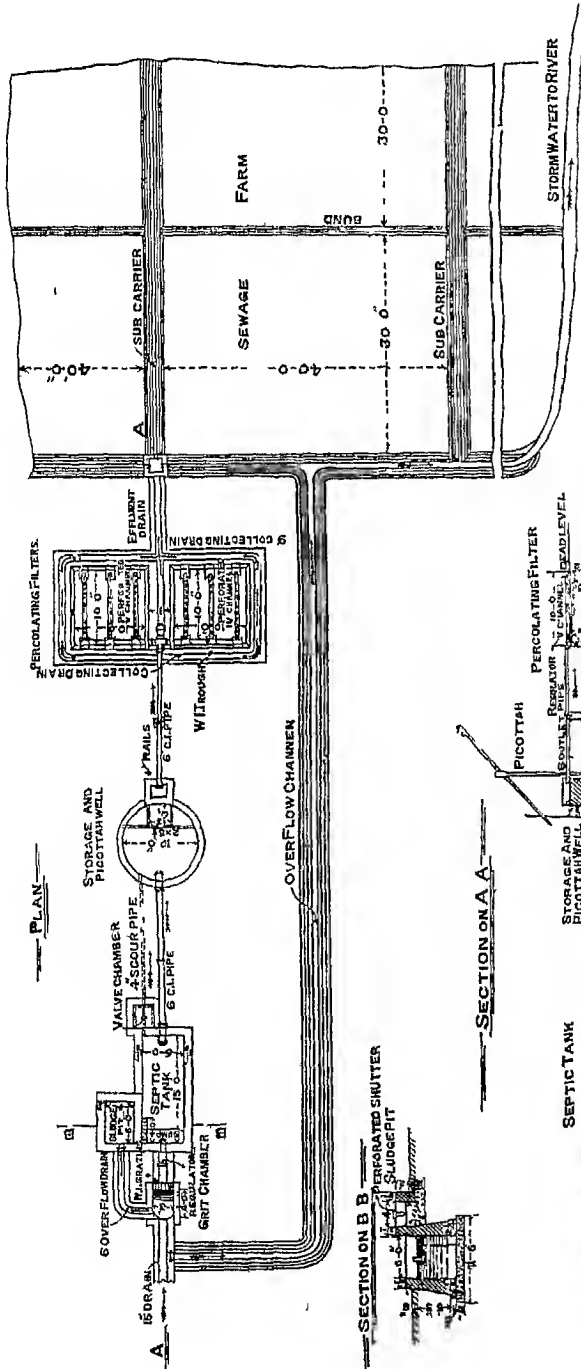
* Reproduced by the courtesy of the Sanitary Board, Madras

† Type designs Nos 164 & 164 A

SAN N^o 64 OF 1914

DESIGN FOR SEWAGE PURIFICATION ARRANGEMENTS

SANITARY BOARD TYPE DESIGN N^o 164.
ISSUED WITH PROCEEDINGS N^o 24/S
DATED 9th JANUARY 1915



W. Hutton
11 11 14
ASSOC. MINEST. C.E.
SUPERINTENDING ENGINEER,
SANITARY ENGINEER TO GOVT.

W. Hutton
13 7 15
SECRETARY SANITARY BOARD

(SIGNED) HORRUSAI NOWROJI
DEPUTY SANITARY ENGINEER
SOUTHERN AND WESTERN CIRCLES

OFFICE OF SANITARY ENGINEER
CHEPAUK MADRAS.

4 If a quantity of sewage is discharged into a shallow pit and left undisturbed, that is, if it does not receive an addition of fresh sewage every day, it will undergo a process of natural purification. The liquid will soak into the soil and gradually disappear, and the solid organic matter will be broken up, oxidized and nitrified, and finally all that will be left of the sewage in the pit will be a residue similar to that of the humus of the soil. This change is effected by bacteria contained in the sewage itself. The biological treatment of sewage seeks to effect these changes in a cheap, quick and efficient manner.

5 *Component parts of a bacterial installation*—The elements of a complete bacterial installation, which is now recognised as being the most efficient, are (1) grit chamber, (2) screening arrangements, (3) septic tank and (4) percolating beds. Indian sewage contains proportionately more earthy matter and harmless vegetable matter, like leaves, than the sewage of European towns. If these matters are not eliminated by a preliminary treatment, they clog up filter beds and reduce their efficiency.

6 *Capacity of the works*—The determination of the quantity of sewage to be treated is an important point as on the quantity of sewage will depend the size of the installation. There are objections to making the plant too large, as there are to making it too small. The existing surface drains are storm water carriers with a capacity of 50 to 200 times the dry weather flow. The only correct method of calculating the quantity of sewage to be treated is to gauge the flow at outlet, and as much as 50 per cent may be added for increased flow during festivals. In preparing plans for an installation in connection with any new scheme of drainage the quantity of sewage may be assumed to be equal to the water-supply, which is usually assumed to be $2\frac{1}{2}$ gallons per head per diem in towns where there is no piped water-supply.

7 *Grit chamber and screen*—In the type-design the sewage from the outfall sewer first enters a small silt-pit

Owing to the increased cross-sectional area of the silt-pit, the velocity of the passage of sewage through it is diminished and this induces the deposition of silt for which a depression is provided in the pit. As the sewage issues out of the pit it passes through a slanting screen. In small installations the width of the silt chamber should be $2\frac{1}{2}$ times the normal width of the drain and the length not less than twice the breadth. The screen occupies the full width of the chamber, and consists of $\frac{1}{2}$ " non bars placed $\frac{3}{4}$ " apart and fixed in angle iron frames. In larger installations the rule is to make the chamber large enough to reduce the velocity of flow through it to not more than 5 feet per minute and its length 2 or 3 times the breadth as calculated above.

8 *Septic tank*—The capacity of septic tanks should not be less than 12 hours' supply or in the present case one-half of 5,000 gallons. The most efficient depth for septic tanks is 5 or 6 feet. In very large installations they are made with an effective depth of as much as 9 feet, but this seems to be with the object of economising space and not because of any better efficiency. The tank should be $2\frac{1}{2}$ times as long as it is broad.

9. A cardinal principle in the construction and working of a filter bed is that the sewage should be admitted, and that it should travel along a plane 15 to 24 inches below the surface of water in the tanks as it is very essential for the satisfactory working of septic tanks that the scum which forms on the surface as well as the sludge at the bottom should be disturbed as little as possible. This is effected in the design by providing bends at the inlet and the outlet—the mouth of the bends being 15 inches below the low water level in the tank.

10 The septic tank is not covered. It was once considered that anaerobic bacteria could only flourish in closed tanks, but that idea is now obsolete, and it is now established that they can do then work in an open tank as well as a closed one.

11 The floor of the septic tank slopes to a valve chamber with a fall of 1 in 60. When sludge accumulates in the septic tank, it can be removed by scoops and discharged into the sludge pit from which the liquid flows back through the overflow drain into the grit chamber and the sludge is carted away.

Any fine silt that remains at the bottom of the tank may be discharged into the storage well by scouring through the scum pipe, by opening the valve. From the storage well sludge will be lifted by buckets and spread over shallow pits where the liquid will soak into the ground and the residue will be a harmless matter resembling the humus of the soil.

12 *Storage well* — In the majority of cases in the plains sufficient fall of ground will not be available to work a bacterial installation by gravitation. A collecting well and some arrangement for lifting the liquid becomes necessary in such cases. Some lifting arrangement had better be interposed between the septic tank and the filter, as it enables the latter to be placed wholly above ground, a condition which has many advantages.

13 The storage well has a capacity of 2,950 gallons or a little more than half the quantity of the sewage to be treated. The lifting arrangement is a piccottah, which is the simplest and cheapest lifting appliance when liquid within the limits of its capacity has to be dealt with. The baling process should be regular so as to secure an even rate of discharge on the filter. The duration of baling should be as long as possible but not less than 12 hours.

14 *Percolating filter* — The percolating filter consists of a concrete platform raised a little above ground level and sloping from its centre to the sides which are surrounded by a drain for collecting and carrying away the effluent.

15 The filtering medium will consist of a heap of broken stone laid over the concreted floor and prevented from sliding down at the sides by retaining walls of dry rubble. Broken

granite forms the best filtering material. The stone should be broken to pass a ring $\frac{3}{4}$ " in diameter.

16 The masonry pillars at the corners and the intervening space serve a double purpose. They give support to the retaining walls and serve to carry the distribution channels.

17 The system of distribution consists of a wrought iron rectangular trough resting on the masonry pillars along one side of the filter with V-channels branching off from it. The V-channels are perforated at the bottom with one-eighth inch holes. The blind ends of the V-channels rest on the opposite row of pillars.

18 *Cost*—The estimated cost (at Madras rates) of the installation is as follows —

	Rs
Silt pit, septic tank, etc ,	600
Storage and piccottah well	510
Percolating filter	600
	<hr/>
	1,710
Supervision $2\frac{1}{2}$ per cent	127
Contingencies 5 per cent	63
	<hr/>
Total	1,900
	<hr/>

The cost may be taken to vary from Rs 1,900 to Rs 2,850 according to the locality.

19 *Conclusion*—The best method of treating the ordinary sewage of towns and villages in Southern India where the dry scavenging system prevails is sewage farming, provided of course that suitable land is available. The requirements of suitable land for sewage farming are that the soil should be light and sandy and that it should be free from liability to be flooded. Where these conditions cannot be secured, the installation of bacterial works is indicated. Experiments made at the King Institute, Guindy, have proved that filtered sewage has no higher manurial value than crude sewage. Owing to

the absence of night-soil in the sewage and the high temperature of Southern India, nitrification takes place rapidly when sewage is spread on the ground. The ultimate result of treating sewage bacterially is its nitrification.

Government Orders and Notifications.

[United Provinces]

ABOLITION OF THE PROVINCIAL AND DIVISIONAL

MALARIA COMMITTEES

PROVINCIAL and divisional malaria committees came into existence under the orders issued in paragraph 8 of resolution No. 301/XVI—54-1910, dated the 1st June, 1910. The duties of the provincial committees were there defined to be those of collecting statistics indicating the spread of malarial fever, of enquiring into the conditions of the disease, and of suggesting remedies. Reports of the proceedings of these committees have been received by the Government periodically, and where it seemed advisable, action has been taken on the suggestions made. Some useful work has been done and the Government is indebted to the members, official and non-official, who have served on it. Experience has however shown that the duties of the provincial Malaria Committee tend to overlap with those of the Sanitary Board, and has suggested the desirability of making them over to the latter body. The functions of the Sanitary Board as laid down in the rules issued in 1912 are to serve as the advisor of the Government and to be the controlling authority on all matters of sanitation, these functions clearly include the initiation and supervision of measures for the prevention of malaria, and it is accordingly anomalous and inconvenient that such measures should be excluded from its purview and relegated to another and independent committee. The Sanitary Board has further the control of large funds, and is therefore in a position to make financial provision in a way that the Provincial Malaria Committee is not, for projects proposed or approved by it. It has accordingly been decided to abolish the Provincial Malaria Committee, and transfer the duties assigned to it under the resolution above referred to, to the Sanitary Board of which the Inspector-

It is also proposed to abolish the divisional malaria committees. The duties allotted to these bodies, when originally constituted, were twofold—on the one hand, the collection of information as to the distribution of malaria in the division, the epidemiology and endemology of malaria including meteorological and physiological conditions, the life-history of malaria-bearing mosquitoes, and the physiological and therapeutic action of quinine and other remedies for malaria and, on the other hand, the study of the local conditions of the habits and wants of the people in the division with regard to the spread of the disease. For neither task have they proved in practice to be adequately equipped. A malarial survey is a condition precedent to the initiation and elaboration of anti-malaria measures, but it requires for its execution the services of an expert, and the divisional committees have not, and cannot well have, at their disposal any expert agency. The surveys that have been made at Saharanpur, Kosi, Nagina, and Lucknow have accordingly been the work of the officers of the Sanitary department and all future surveys will be similarly initiated and controlled. In several divisions the committees have already ceased to meet, and in the remaining divisions the results achieved are not such as to justify their further retention. [G. Res 68/XVI—9 of 1915, dated 23-2-1916.]

Legislative Intelligence.

[Imperial Legislative Council]

The Hon'ble Rai Sita Nath Ray Bahadur asked whether Government had received the opinions of the several Local Governments on the question of adulteration of food stuffs.

Government replied that the replies of the Local Government had been received and were under consideration.

The following resolution moved by the Hon'ble Mr. Surendra Nath Banerjee was accepted by Government and passed —

“ That this Council recommends to the Governor-General in Council (a) to instruct the Provincial Government to take vigorous measures for the prevention of Malaria, and (b) to publish an annual statement showing the progress made by each Province in this matter ”

[United Provinces.]

The Hon'ble Lala Sukhbir Singh asked Government whether any and what steps had been taken to inquire into the question of organising Village Panchayats and whether Government would associate one or more Indian non-officials with any officer or officers who may be appointed to conduct the inquiry?

Government replied —A small committee consisting of a Collector and a Deputy Collector has been appointed to frame definite proposals for legislation. In view of the recent full discussion in the council it seemed unnecessary to have a larger number of members of the committee. Full facilities will be given for non-official criticism.

The Hon'ble Saïyid Ali-i-Nabi, Khan Bahadur asked — What steps are being taken to educate villagers in sanitary principles? Will Government be pleased to consider the inauguration of a scheme of model lectures by competent men on various subjects affecting the daily life of the villagers, a translation of such lectures into simple Hindustani to be delivered to the rural population through the agency of the sanitary and the educational staff on the same lines as work in this direction is being done in Madras?

Government replied —Lectures and demonstrations on public health and on the more common Indian diseases are given at local fairs and exhibitions, with a view to spreading a knowledge of elementary hygiene. The Government has also under consideration the establishment, when financial conditions permit, of a service of district sanitary officers, one of whose duties will be to educate villagers in simple sanitary principles. The question of teaching hygiene to the children in primary schools has also engaged the attention of the Government, and arrangements to this end are being worked out by the educational authorities.



Recent Publications.

A HANDBOOK OF CIVIC IMPROVEMENT By Helman & James, University of Texas Price \$ 1

FIRST AID IN ACCIDENTS By Rao Sahib U Rama Rao, Lecturer and Examiner to St John Ambulance Association, South Indian Provincial Centre G A Natesan & Co, Madras Price Re 1

[A highly useful and instructive publication We would suggest its introduction in all schools, especially Police Training Schools]

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BUDGET

Bladdoeck (J Harold) Some suggestions for preparing a budget exhibit (Amer Acad of Pol and Soc Science Annals, November 1915)

EXCESS CONDEMNATION

A Report of the Committee on taxation of the City of New York

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Bowes (J H) Municipal Finance (Can Mun Jour, November 1915)

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Allison (Richard) The Housing Problem. (Jour Roy San Institute, August 1915)

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(New York City Department of Health Reprint Ser No 34) The mosquito as a pest and as a carrier of malaria

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Requirements for refuse receptacles (Amer Mun Jour, November 18, 1915)

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Ormond (William C) Assessments for Local Improvements (Municipal Engineers, City of New York Proc, 1914)

Notes.

RANGOON MUNICIPALITY MILK SUPPLY —The Rangoon municipality adopted the following report of the special sub-committee appointed to consider the objections received to the revised draft bye-laws concerning the question of the milk supply —

The Sub-Committee after making a slight alteration in by-law 10 regarding the washing of cattle before milking by omitting the words "with clean water immediately," unanimously agreed that where important innovations are made in these by-laws they should be introduced gradually, that the interests of small vendors should be overlooked in introducing the new system, and that the draft by-laws should be submitted to the Local Government for sanction with the necessary covering letter, explaining that the new provisions in the bye-laws will be enforced gradually and that for the first 6 months at least it is intended to confine action to the collection of information of the conditions under which milk is produced outside Rangoon and to test the milk imported into Rangoon on its arrival at the central Railway Station where the depot will be established

STANDING SUB-COMMITTEES —The following bye-laws which have been made by the Rangoon Municipal Committee

under section 30, sub-section (1), and have been confirmed by the Lieutenant-Governor under section 30, sub-section (2), of the Burma Municipal Act 1898, are published for general information under section 201, sub-section (1) of the Act, in supersession of bye-laws 55 and 57 of the bye-laws published in this department Notification No 123, dated the 15th October 1908 as amended by this department Notification No 148, dated the 2nd August 1911 —

The Standing Sub Committees shall be appointed as follows —

- | | |
|------------------------|------------------------------|
| I Finance | III Water and Sewage |
| II Roads and Buildings | IV Public Health and Markets |
| | V Election |

Such Standing Sub-Committees shall consist of not less than seven or more than twelve members of the Committee, including the President and Vice-President

The following subjects shall be submitted to the Standing Sub-Committees —

To the Finance Sub-Committee —All matters connected with accounts and revenue, bye-laws and rules, and the conduct of business

To the Roads and Building Sub-Committee —All matters connected with roads, lighting, buildings, parks and gardens and allied subjects, with their establishments

To the Water and Sewage Sub-Committee —All matters connected with water-works, sewage works, fire brigade, workshop and allied subjects, with their establishments

To the Public Health and Markets Sub-Committee —All matters having reference to vaccine operations, all matters relating to the management and regulation of municipal and private markets and municipal and private slaughter-houses, all matters connected with the keeping clean of public streets, roads, drains, tanks and water-courses, the sanitary condition of lodging-houses, and all matters affecting the public health

To the Election Sub-Committee —All matters connected with municipal elections

MUNICIPAL LOANS —The Municipal Board of Muzapole have applied for a loan of Rs. 10,000 from Government for

puichasing meters and water works fittings at an estimate of Rs 8,000 and for meeting excess in cost of water works above the estimate (Rs 2,000) The loan is to be repaid in twenty half yearly instalments The Chidambaram Municipal Council has applied for a loan of Rs 24,000 from Government for the payment of municipal contribution to Public Works Department for the completion of water works The loan is required for a period of twenty years and it will be repaid in twenty equal instalments

OOTACAMUND MUNICIPALITY —There being very little probability of the Pykara Falls Hydro-Electric Scheme materialising in the near future, the Madras Government have requested the Ootacamund Municipal Council to reconsider its proposals and communicate the result to them as early as possible

MYSORE MUNICIPAL COUNCIL —The Council has approved a proposal that it should undertake to have bricks manufactured with a capital outlay of Rs 5,000 and sell the same to *bona fide* house builders in the city at cost price The proposal has been submitted to Government for sanction





THE RIGHT HONOURABLE SIR FREDERIC JOHN NAPIER
THESIGER, P C, G C S I, G C M G, G C I E, BARON CHELMSFORD,
VICEROY AND GOVERNOR-GENERAL OF INDIA

The Local Self-Government Gazette.

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APRIL

[1916

The New Viceroy.

IT gives us peculiar pleasure in offering our most hearty welcome to Lord Chelmsford. His Excellency is essentially a "municipal man." "I must confess," His Lordship said, in replying to the address of the Bombay Corporation, "that municipal work, especially in the educational sphere, is my first love." The sentiments that he expressed in his replies to the municipal addresses presented to him, foreshadow, if we mistake not, the bright future that Local Self-Government has before it under His Excellency's Viceroyalty. Lord Chelmsford has had large experience as an administrator, but, as pointed out in the address of the Bombay Corporation, the portion of His Excellency's past experience which appeals to us most is his share in Local Self-Government. As Member of the London School Board, as Member and Alderman of the London County Council and as one who, to use His Lordship's own words, "for the greater part of his public life has been identified with municipal activity," His Excellency has gained vast experience in civic government, and we have no doubt this experience will enable His Excellency to view our aspirations with genuine sympathy.

The task of developing Local Self-Government has been rendered somewhat difficult in this country by attempts made in certain quarters to sow the seeds of dissension by introducing principles and methods not always calculated to the realization by the people, "whether as electors or administrators, of the pre-eminent importance of municipal administration which so intimately touches the community in its every day

life " The recent municipal legislation in the United Provinces is perhaps a striking instance in point There are problems peculiar to India connected with municipal administration which may not have presented themselves to His Excellency for solution in his past experience and no doubt His Excellency will soon have to face them But we have every confidence that the presence of the Indian member—one of the most eminent of India's sons—will facilitate a proper understanding of these problems and of the right policy to be adopted, and let us pray that Local Self-Government—especially in its sanitary and educational departments—will receive a rapid advance under His Excellency's Viceroyalty At the same time we would impress upon all those engaged in Municipal Government the high ideal preached by His Excellency

"It (municipal work) has to my mind the pre-eminent merit of being removed to a large extent from the ordinary divisions of party politics and men differ only, or should differ only, according to their respective views of the expediency of a particular piece of concrete work Those who engage in it for the most part, and I speak from my experience of my late colleagues on the London County Council, *look for no reward beyond that of satisfaction in good work well done on behalf of the community*"

Co-operative Societies and Rural Sanitation.*

IN commending for the consideration of Local Boards certain proposals for the construction of protected wells in villages as a remedial measure against cholera, the Madras Government expressed the view that rural Co-operative Societies may with advantage be employed in effecting sanitary improvements in the area of their operations and remarked that if in the opinion of the Registrar of Co-operative Societies developments of this description were feasible, the

* We hope to deal with this subject more fully in our next issue and refer to the policy of the Board of Revenue (Madras)

Government would be prepared to consider the possibility of providing through the Agency of the Local Boards concerned grants-in-aid from Provincial revenues. The Registrar reported that some Societies would be willing to render a service so useful to the public and he was inclined to think that a trial might be made. Government accepted the Registrar's proposals and asked him to select 20 societies in non-union areas in such a manner that the experiment might be tried in as many districts as might be practicable. Accordingly, the Registrar sent in proposals for 13 Societies at first. Government approved of those proposals and sanctioned the grants through the Local Boards concerned. Details of the societies and works are given below —

Serial No	Name, number of the society	Construction of work	Amount of grant
1	Nerur, No 879, Karur Taluk, Trichinopoly District	Construction of well	Rs 1,000
2	Manapparai, No 197, Kullatalai Taluk, Trichinopoly District	Repair of seven wells	700
3	Sengalipuram, No 76, Naanilam Taluk, Tanjore District	Repair of three drinking water wells	250
4	Poundarikapuram, No 82, Kumbakonam Taluk, Tanjore District	Sinking four wells	100
5	Selukkuvarpatti, No 755, Nalakkottai Taluk, Madura District	Sinking of five wells	500
6	Olakkur, No. 717, Tindivanam Taluk, South Arcot District	Repair of a tank	600
7	Hamsavaram, No 245, Tami Taluk, Godavari District	Repair of wells	200
8	Duggirala, No 357, Tenali Taluk, Guntur District	Sinking two wells	221
9	Vindur, No, 981, Gudur Taluk, Nellore District	Repair of streets	260
10	Malayanur, No 219, Kalyandrug Taluk, Anantapur District	Construction of a well for panchamas	150
11	Erayamangalam, No 356, Tiruvallur Taluk, Chingleput District	Repair of a tank	42
		Construction of a parapet wall for the drinking water well	560
		Construction of a parapet wall and platform to a drinking well	
		Repairing a drinking water well and providing it with a parapet wall and pulleys	
		Deepening a drinking water tank	

Serial No	Name, number of the society	Construction of work	Amount of grant
12	Kammalampundi, No 134, Madurantakam Taluk, Chingleput District	Repairing a pond Digging a well	Rs 150 250
13	Kilacheri Agricultural Bank, No 2, Tiruvallur Taluk, Chingleput District	Completion of a new tank Repairing a paracheri pond	400 235
Total			Rs 7,218

Seven other societies were subsequently added to the list with the sanction of Government. In sanctioning the proposals, Government said that these small grants might be expended without the formalities required by the Local Fund Code and Standing Orders, and they were satisfied if the President of the Taluk Board concerned should in person inspect each work and report to them through the Registrar of Co-operative Societies, whether the money had been properly laid out and how far it had been supplemented by local contributions.

Details of the seven proposals added to the original list

Serial No	Name, number of the society	Construction of work	Amount of grant
1	Mangalam, No. 443, Suvilluputtur Taluk, Ramnad District	Repair of 5 wells and sinking 4 wells	Rs 2,000
2	Vadamalapuram, No 147, Sattur Taluk, Ramnad District	Three wells for panchamas. Side drains in the street. Repair of one well.	1,750
3	Vayapadi, No, 186, Erode Taluk, Coimbatore District	Digging a well	750
4	Kambhampatti, No 184, Erode Taluk, Coimbatore District	Do	750
5	Mettupudur, No 409, Erode Taluk, Coimbatore District	Do	750
6	Kalampundi, No 42, Madurantakam Taluk, Chingleput District	Digging a well in paracheri	800
7	Kilacheri, Tiruvallur Taluk, Chingleput District	Improvement to the existing pond	4,100
Total			Rs 10,400

Fifteen of these works have been completed. The Presidents of Taluk Boards in submitting their reports to Government through the Registrar have in most cases expressed the opinion that the works have been well and satisfactorily carried out, that the money was properly expended and that it was supplemented by local contributions in some cases.

The following four works are in course of execution and they are expected to be completed very soon —

1	Sulukkuvaipatti	Sinking and repairing of wells at a cost of	Rs 1,050
2	Kammalampundi	Repairing a pond and digging a well at a cost of	2,000
3	Kaliyampundi	Digging a well in paracheri at a cost of	300
4	Mangalam	Repairing of wells at a cost of	2,000

The biggest item—improvement of the drinking water tank at Kilacheri estimated to cost Rs 4,100—is in abeyance for want of facilities to carry out the work with due regard to the requirements of the Sanitary Board.

The Panchayatdars of the Societies rendered gratuitous service in executing these works and in addition most of the Societies' works cost less than the professional estimate. To give only one instance, one of the Societies was reported to have done work worth Rs 741, while as a matter of fact it spent only Rs 560.

An All-India Sanitary Board.

AT the meeting of the Imperial Legislative Council on the 22nd February last, the Hon'ble Maharajah Ranjit Sinha of Nalpur moved a resolution recommending the formation of an All-India Sanitary Board, composed of officials and non-officials, for advising the Government of India on the sanitary requirements of the country. The resolution met with the usual fate of such resolutions, and the full official report of the discussion that we have now before us explains in some measure why it did not meet with a better fate.

It is not easy to infer from the arguments advanced by the Hon'ble Maharajah that he had any clear conception in his own mind of the duties and responsibilities of the body which he proposed to create. Everyone knows broadly what are the existing defects in the sanitary environments of our people and what are the first steps to be taken to improve them. It does not require a body of officials and non-officials to advise the Government of India that the provision of a pure water-supply, the adequate draining of a water-logged area, or the cleanly disposal of the filth and rubbish that accumulate near human habitations, require the immediate and constant attention of the authorities. How to bring these about is really a matter for the Local Governments and the local authorities under them. The question is whether, when such detailed proposals are sent up by the Local Governments, anything useful will be gained by submitting them to the scrutiny of an All-India Sanitary Board before the Government of India allot the necessary funds to carry them into execution. But it is just this question that the Hon'ble mover of the resolution has failed to tackle and it is no wonder that the Hon'ble Sri C. Sankaran Nair took advantage of this weakness in the argument and literally demolished the position taken by the Maharajah. It is to be hoped that the representatives of the people will first of all try to understand clearly and definitely *what* they want and *why* they want it before rushing to the Imperial forum to demand anything.

The Hon'ble Member in charge of education and sanitation made it clear that the present policy is to leave it to Local Administrations to initiate and carry out all sanitary improvements, except the conduct of scientific research. They have to go up to the Government of India only for the necessary financial assistance in the case of such big schemes as are clearly beyond the ordinary resources of the Local Administration. Sanitary Boards, as such, then have their place and their value under Local Governments, and the Government of India have advised Local Governments to add

competent non-officials to the composition of the Local Sanitary Boards. But the small measure of independence given to Local Governments includes the freedom for them to accept or reject the advice thus tendered to them, and it is the business of our popular representatives to see, if they are convinced of the need for the non-official co-operation in the work of the Sanitary Boards, that their Local Governments make effective provision for securing such co-operation.

This reminds us of the interesting discussion that took place at the meeting of the Madras Legislative Council held in November, 1915. The Hon'ble Rao Bahadur M. Ramachandrarao moved a resolution recommending the Madras Government to accept the advice of the Government of India and to reconstitute the Local Sanitary Board by adding some non-officials as members of that Body. But the Madras Government would not. They questioned the utility of non-officials except to swell the numerical strength (and impliedly also the talking capacity) of the Board, they protested against the method of the non-official members of the Legislative Council in pressing unpalatable resolutions on the Government, which to an urbane Government smacked very much of those of a highway man with his pistol in hand, they talked very learnedly of the wonderful and mysterious machinery of administration, how each province had its own patents and how it was impossible to adopt the patent of another province, even though the patentee did not claim any exclusive right over his invention. And when all this talk, not unnaturally, ruffled the temper of the non-officials, the Government suavely explained that all the hard things they said were meant in a Pickwickian sense and there was peace and concord and the resolution was decently killed and honourably buried.

This shows that it is not an easy matter to convince a Government even with reasons and examples on your side. No wonder that the proposal of the Maharajah of Nashipur, unsupported by reason or by example, met with very short shift indeed.

The Madras Local Boards Act.

Suggestions for Amendment *

[VIEWS OF THE DISTRICT BOARD OF TRICHINOPOLY]

IN the resolution declaring the Local Self-Government Policy of the Government of India, dated 28th April 1915, it was observed that District and Sub-District Boards "should have adequate funds and a large measure of independence and their jurisdiction should be so limited in area as to ensure local knowledge and interest on the part of the members and be at the same time a unit well-known to the people"

"District and Sub-District Boards in the opinion of the Royal Commission for Decentralization, should contain a large preponderance of elected members together with a nominated element sufficient to secure the due representation of minorities and of official experience. The Government of Madras are prepared to raise the proportion of elected members to two-thirds and one-half of the maximum strength on District and Sub-District Boards respectively." *Our recommendation is that in both cases this proportion of elected members be raised to three-fourths of the maximum strength of these bodies.* We say so notwithstanding that we had to fill, in the past, elective seats by nomination for want of candidates contesting the same. We feel that the habit of exercising the elective franchise is one that develops but slowly, but it is bound to be acquired in due time by the measure which we recommend. It takes some time for the realization by an electorate of the value of its suffrages. We should throw open seats for election and encourage the exercise of the privilege, rather than withhold electoral privileges and say that we have to do so because they are not likely to be duly

* In G. O. No. 1778 L, dated 3rd December 1915, the Madras Government notified that they had under consideration the amendment of the Madras Local Boards Act, and called upon all District Boards to submit any suggestions which they may have to make in the matter. The reply reproduced above, prepared by its Vice President, Dewan Bahadur T. Desikachariar, has been approved by the District Board of Trichinopoly for submission to Government.

availed of. We must be prepared for some disappointment in the beginning, till the altered conditions come to be well-known and duly utilized

“The Commission were of opinion that an official “should remain, as he usually is at present, the Chairman of “every District and Sub-District Board” but “the Government “of India will have no objection to non-Official Chairmen” being appointed where a Local Government desires to make the experiment. The existing Act enables the election of Presidents and does not seem to require amendment. But it is left with the Government of Madras to give effect liberally to the recommendation of the Commission in the matter of trying the experiment suggested by them

“The funds of District Boards are mainly derived from a “cess levied upon agricultural land over and above the land “revenue, with which it is collected and not usually exceeding “one anna in the rupee. Since 1905 this income has been “specially supplemented by Government contribution amount- “ing to 25 per cent of the then existing income. Besides “this, special grants are frequently made to District Boards “by Local Governments.” These have enabled us in some measure to undertake in the past the construction of wells and the framing of schemes for the improvement of villages and the maintenance of trunk roads—activities from which we had been debarred previously by our chronic poverty. These grants, however, are not likely to be made for some years to come. Moreover, it is not right that the Local Boards should be dependent upon such precarious sources of revenue. Our needs are growing. Our normal revenue is hardly enough to maintain our communications, in even an apology for repair. Even with the subsidies which we have been receiving in the past, our condition has been one of tribulation. We have had to hold up works of public utility that were urgently needed. And what is true of this District is equally true elsewhere in the Presidency, or for that matter, in the Empire

It was the opinion of the Royal Commission that District Boards should not be empowered to raise the land cess beyond the limits laid down by the existing Act. The majority of well-informed opinion in this District is in agreement with this considered declaration of the Commission. We have availed ourselves of the existing privilege of raising a special extra land cess of three pies in the rupee for the construction of our Railway outside the Imperial programme. By adopting this expedient, we hope to become eventually the owner of the District Board Railway. More than this we are not in a position to do in the matter of the augmentation of our income by increasing the burden on the occupier of land. Conditions, however, have considerably changed and our responsibilities have increased year after year. Accordingly, we must find a new local source of income, if we are to meet our existing demands adequately or in some measure approaching thereto and the first suggestion we make is that we be given powers by legislation to levy a super-tax of one anna in the rupee on the Excise Revenue. This will merely tax a luxury in a country like India and will not be unpopular. The cattle pound receipts may also be made over to us. And we may be allowed to levy a tax on Professions and Arts in extra-municipal areas as is now done in municipal areas.

A further recommendation of the Royal Commission was that Rural Boards should have full power to pass their Budgets subject only to the maintenance of a prescribed balance. The Government of India consider that the present restriction on the powers of the Boards with regard to Budget expenditure should be gradually relaxed with due regard to local conditions and requirements. We do not see why the recommendation of the Commission should not be fully given effect to without any qualifying restrictions such as those referred to above. This perhaps depends upon the sympathetic appreciation of existing conditions by HIS EXCELLENCY THE GOVERNOR IN COUNCIL rather than on legislative sanction,

but the matter could be set at rest definitely and with certainty by investing the Local Boards with some measure of autonomy that would render them independent of outside agency and only liable to have their actions revised by Government in gross cases of abuse of power or maladministration.

The Commission was also of opinion that the existing stringent restrictions on Rural Boards with regard to estimates for Public Works should be removed. We employ trained and well-paid engineers and we would suggest that there is no reason why we should not be permitted to have unfettered discretion with regard to our estimates, subject to such outside control as is referred to in para 36 of the Government of India Resolution.

The Commission recommended the constitution and development of Village Panchayats possessed with certain administrative powers, with jurisdiction in petty civil and criminal cases and financed by a portion of the land cess, special grants, *receipts from village cattle pounds and markets and small fees on civil suits*. The Madras Government are desirous of establishing experimental Village Panchayats but consider that action should be confined for the present to the encouragement of *Voluntary Self-contained Organisms*, independent of statutory sanction and consisting of *Village Elders* conferring together for common village purposes. While we are grateful to the Government of Madras for their recent attempt to encourage the formation of Village Panchayats, we would wish to have the recommendation of the Commission given effect to as liberally as possible and legislation undertaken with that object. For various reasons, 'the Committees of Elders' and 'Voluntary Self-contained Organisms' do not in practice exist. The genius of Self-Government is still only latent in the people. But there is absolutely no reason why we should not allot a small portion of the cess collected to each village for objects appealing immediately to the villager, to be expended by himself rather than by the Taluk or District

Board Member hailing from many miles away. With such a measure of reform and encouragement, the potential activities in question should soon exhibit themselves in concrete form, just as there has developed a capacity to manage successfully the hundred and more Co-operative Credit Societies in this District greatly to the relief of agricultural indebtedness. A Local Fund Taluk is too large an area to permit of members of existing Taluk Boards having that local knowledge or interest which is requisite to make them really useful in the administration of village affairs, the members of such a large unit are also not well-known to the great bulk of the people. The existing Unions serve a very insufficient number of Villagers in each Taluk and hemmed in by rules and limited by financial restrictions, as they are, they are but ill adapted to bring home the benefits of Self-Government to the people in rural areas. There are no doubt thirty-eight elective seats in this district for the four Taluk Boards distributed Fukawai. But, as above observed, these members obviously cannot have that local knowledge or interest, nor, in existing circumstances, that influence or prestige which might bring Local Self-Government to the Village Unit itself. Rural Sanitation and Village roads are both in woeful condition. Villages grow without plan and order and human beings and cattle live in a squalor unknown to the theoretical politician who admires from a distance but who possesses only a fancy portrait of a peasant dwelling in Arcadian simplicity amidst ideal surroundings.

The same causes which have induced the disruption of the joint-family system have also conduced to the disintegration of the communal spirit. The realization of the individual entity as opposed to the communal appeared when owing to peace and good government, the necessity to present a united front to marauding and predatory onslaughts disappeared. The establishment of 'good order' and 'settled Government' left time to the individual to think of his own progress in life in preference to that of his community.

Kinsmen no longer united in a clan and strangers were introduced into the Village. Gradually the Village Headman ceased to be really a Headman, and to-day he is but a mercenary, and the time has come when hereditary claims to the office have often to be subordinated to considerations of efficiency. We have arrived at a stage in which it is vain to expect voluntary co-operation of self-contained organisms for carrying out objects of public utility. The genius for Self-Government is still in the people, but it requires legislative aid to foster it and to transform potential into kinetic energy. This cannot be achieved by the Taluk Boards and Unions, constituted as they are.

The advancement of Primary Education, the extension of Medical Relief and Vaccination, the improvement of Village Communications, the possession of a safe drinking water-supply, the attention to the sanitation of rural areas are the first needs of every ultimate unit in any revenue area. Village temples and local charitable and religious benefactions have been neglected. The Villager wants to keep up his temple and his local charities and wants also money to repair his tanks and to maintain the communications giving approach to his village. He would wish to administer some rough and ready justice without the expensive and tedious process of recourse to established Courts of Justice. These are the only matters in which the Villager is likely to take interest. The old Village Communities raised taxes, paid perhaps a portion of them to the King and used the rest for these purposes. In Chola times there seem to have been Committees of various sorts answering to the diverse needs of the village, and the state of disorder and anarchy which followed left the villager unaffected. But they died out *pari passu* with the re-establishment of order and good government by the Company. If the Village Panchayat or Committee is to be renewed, it will not be by constituting Unions of the sort in vogue now. Villages, whether singly or in groups, should be converted into

Self-Governing Units having the liberty to expend a portion of the cess levied in each area unfettered by rules and un-encumbered by the machinery provided for the administration of Unions under the existing enactment. The Panchayat must be made a genuine Self-Governing Unit. Petty litigation, civil and criminal, should be finally settled by it. And no compunction need be felt in discarding the notions engendered by what may have been assigned to Village Courts under existing enactments. The villagers must somehow feel that a portion of the taxes raised in his village is being expended by him in and for the place of his birth. Public opinion in villages must be fostered by real incentives. The capacity to share responsibility will develop, as the result of the villagers being given it. The association of Union Panchayats with an elaborate machinery and the imposition of additional taxation has certainly not been calculated to make them popular, and strenuous protests from villagers against being unionized are no uncommon thing. Such a thing could not occur if we started with a unit well known to the people, composed of persons who had local knowledge, interest and influence in a limited area. We do not know what reports will be submitted on the recent Government Order regarding the formation of Village Panchayats. We would prefer not to wait for them but to formulate a definite scheme at once, and take advantage of the proposed amendment of the Local Boards Act to give legislative sanction to the formation of small Village Panchayats governed by the District and Taluk Boards.

If Local Self-Government is to be a success in India, we must start with the Village Unit and work up to the Taluk and District Boards rather than going the opposite way, as we have till now been doing. District and Taluk Boards have so far been mere adjuncts to the revenue collecting machinery of the Government. The members have appeared at stated intervals and been passive spectators of the proceedings which they could not take an informed interest in. The fault is not,

however, than but that of the system. The area of the Taluk Boards has been so far much too large for the members to take any interest in or possess any real knowledge of the subjects brought up before each meeting. These considerations should be borne in mind in any legislation to develop local administration if it is to achieve any measure of success and eventually to relieve the Provincial and Imperial Government of a portion of their burden.

The definition of a Union in the existing Act is sufficiently wide to permit of the formation of these 'Village Panchayats'. Let them be at once formed with a minimum of rules to regulate their administration, neither elaborate nor rigid, but calculated to afford free play to the instincts of Self-Governance, Self-Reliance and Self-Respect.

In making this proposal, which looks like an attempt to restore the old Panchayat system, it is not intended to repeat the time-honoured assertion that India a thousand years ago enjoyed a golden age and that we are fallen on evil times. The very benefits of British Administration have made some institutions die out, but our belief is that they have so died out owing to adventitious causes and that the material is still available for their revival though no doubt on improved lines, and that we may set about it without vacillation or hesitancy.

Not having the Draft Bill before us, we have taken the liberty of referring to the recent Resolution of the Government of India and of supplementing the observations therein by our own remarks born of actual experience in Local Administration. The general principles enunciated in para 39 of the Government of India Resolution which indicates the lines in which advance is most likely to be successful in the organization of Village Panchayats seem in our opinion to be over-cautious. We consider that Village Panchayats charged with administration of rural affairs may be formed and encouraged, by Unions organized under rules under the amended Act.

conceived more liberally than they are now, and by giving legislative sanction for the creation of independent sources of revenue for their efficient administration

The following points must, we consider, be dealt with in any amendment of the existing Madras Act V of 1884 —

- (a) The Jurisdiction of Taluk Boards
- (b) The Constitution of Unions and Panchayats
- (c) The Elective Majority
- (d) Non-Official Presidents and Vice-Presidents of Taluk Boards
- (e) Augmentation of Financial Resources
- (f) Independence in Budget and Expenditure

In the foregoing paragraphs we have ventured to express our opinions on these points as far as was possible without having the Draft Bill before us. The views expressed are such of those secured from the Taluk Boards as met with the District Board's approval

Public Hygiene.

[BY DR M R SAMEY, M D , D P H , (U S A),
M R SAN I , (LOND)]

AS well as the cure of disease, there is the matter of its prevention—a very important matter and one now much better recognized than in times past. The conviction that prevention of disease is a better method than cure, even if cure were invariably attainable—which it is not—is now generally prevalent. This is partly the result of better general education and the spread of information, but it is also not a little due to the fact that the wear and tear of life, the direct consequence of the pace at which we live, is such that few systems are fit to bear fairly well the test of acute disease

This last applies rather to the dwellers in towns than the denizens of hamlets and villages, is more true in the hives of industry than in the scattered population who follow agricultural pursuits. The pace at which we now live is much faster than that of our immediate predecessors, nor is there any prospect of immediate retardation, though it may be questioned appropriately whether man will continue indefinitely his present feverish pursuit of wealth. It is not merely to make ends meet that man, and especially the twentieth century man, struggles so strenuously and persistently, the early exertions are continued and, if possible, increased in order to make a fortune—for nowadays it would seem that the prevalent opinion is that without wealth life is scarcely endurable. A truer and juster idea of happiness and comfort must prevail and man ought to find himself more agreeably and more profitably engaged in other questions than the gain of mere material wealth. It is only of late years that wealth has been readily attainable by any considerable number of people, and its dazzling fascination blinds mankind at present to the evils and the drawbacks which underlie the alluring surface. Experience, however, is being rapidly furnished to demonstrate that wealth is not the royal road to happiness, that money-making may warp the intelligence and dwarf higher qualities, that in material wealth we are not to find unalloyed good. At present, however, we live in an age which is pretty universally finding out the powers of endurance of every individual by the searching test of over-exceeding them. It is not in commerce only that this high-pressure existence obtains in every walk of life now there is a general pushing forward, a great deal is expected now to enable the individual to hold his own, how much more then is required in order that each may pass his fellows in the race of life? It is the sustained rate of life-speed which requires that the individual shall lose none of his headway by intercurrent sickness, that gives a stimulus to public hygiene. Man in his

swift pursuit of wealth does not wish to lose ground by sickness. He takes care of his health in order that he may grow wealthy, but he does not grow wise in proportion, and his care of himself in many ways is more than counterbalanced by his gross neglect of himself in others.

The House we live in

Much ill-health is the direct consequence of ill-built, or ill-planned houses, of low rooms, of insufficient sunshine, and, still more, of bad ventilation and worse sewerage. The primitive arrangements of nomadic tribes are utterly unsuited to the existing circumstances of the day. The magnificent sanitary arrangements of past civilizations were lost during the dark ages. Cloacal arrangements were entirely lost sight of, the streets were sewers, while water was drawn from wells immediately underneath and amidst this filth, the floors of houses were strewn with rushes, amidst which refuse and water accumulated, a fresh layer of rushes merely hiding the nastiness it concealed, but did not remove, in churches lay the decomposing dead, poisoning the living, crusaders ignorant of, as well as fanatically disregarding of, all sanitary laws, spread pestilence in their marches, plagues and pestilences decimating, nay, depopulating whole territories, as any one who has read Haeckel's "Epidemics of the Middle Ages" well knows, were constant and persistent, while the ordinary heavy death-rate at times ascended to a terrible fatality. From such a state of matters we are now awakening, not, however, without repeated reminders in the forms of severe outbreaks of preventable diseases, we are setting to improve matters, and to entertain the question of hygiene, and to recognize the value of sanitary arrangements. Consequently houses are now built with better regard to their position; so far as is possible, to the foundations, to the regular supply of water and of air, and the proper removal of all waste and fecal matter. The importance of sunshine to the health of humanity is now recognized. We know from barracks

how lack of sunshine and ill-health go together. We have learnt that spacious rooms, giving a large cubic space to each individual, are of little avail unless that air be changed repeatedly, and for this end ventilation is imperatively necessary. By too carefully closing every aperture all the evils of bad ventilation are artificially secured. The advantages of large bedrooms at night are lost and neutralized by burning gas for hours in these rooms in the evenings, closing every crevice against a draught. There are no means for the renewal of the air and under such circumstances man seeks to fit himself for days of toil and exhaustion. The storing up of oxygen at night, as Voigt has shown, for the needs of the waking hours, so necessary and desirable, is as far as possible prevented by the very individuals who need it most. How far such nocturnal storing up of oxygen by the humbler classes, whose houses do not admit of proper ventilation, is impossible, it is not easy to say. Their neglect of sanitary arrangements is not merely an outcome of indifference, but is largely the unavoidable result of poverty. Plentiful supplies of fresh air are desirable for every living thing, and if, under certain circumstances, they are unattainable, in a great many other instances their absence is the result of ignorance or indifference.

The importance of sufficient ventilation in our public buildings is not yet sufficiently recognized. Churches, theatres, places of public entertainment, picture-galleries, &c., are all liable to produce distinct and tangible effects, such as faintness, headache, malaise, upon some individuals who are susceptible to bad ventilation and foul air, while similar but more persistent effects are produced in less susceptible individuals when chronically exposed to such conditions. In railway carriages, in tramway cars, and in omnibuses, this disregard to the necessities of the system in the way of a sufficient supply of oxygen is painful to see, as well as to bear, for those who do understand the subject. An object

fear of cold from free supplies of air absorbs all the attention of many individuals, and renders them forgetful of other evils which do not lie so immediately at the surface

Water

The importance of a good supply of pure air is not nearly so well appreciated generally, as is the necessity for free supplies of pure water. Mankind has ever sought to get a clear and sparkling water, and objects to it if its smell be unsavoury, but of the finer and subtler contaminations he has remained, until recently, profoundly ignorant. A constantly impure water-supply leaves the system less equal to resist an epidemic form of disease. It is not that water is often the direct source of disease, as diarrhoea and typhoid fever, but it is commonly a cause of a gradual, steady deterioration of the health, which is revealed by the inability of the system to withstand the strain of some acute intercurrent disease. It is not in towns only that the evil effects of a contaminated water-supply is felt, indeed they have been too rudely awakened by irrefutable facts to be any longer oblivious to the consequences, but also in the country, where wells lie close to sinks and middensteads, where the village stream furnishes to those at one end of the hamlet as a beverage, the sewage of the house placed further up. In few villages is the water to be trusted, unless it be the product of some well-cared-for spring, or some exceptional well. Repeated outbreaks of typhoid fever have accumulated evidence on this matter, which is sufficient to convince the most sceptical.

Sewage and Sewerage

Closely connected with water-supply is sewage. The fact that in large communities the water-carriage system is the only practicable one, and the other fact, that if the sewage were entirely removed from waste water-supply, the sewers would no longer receive the benefits of being flushed by the waste water in rainy seasons and in thunderstorms, cause the question to be more complicated than it would be, if the

axiom "the rainfall to the river and the sewage to the soil", were capable of practical application. As it is, the two matters are bound up together in such a manner that they cannot be separated. We know, however, that many outbreaks of disease are occasioned by the water-carriage of sewage. Not only is sewer gas apt to diffuse itself from the water-closet trap, and so to poison the inhabitants of the house, but leakage from sewer-pipes is apt to penetrate the water-supply, and so cause disease. The possibilities of water contamination by sewage are so numerous that it would be simply impossible here to indicate a tithe of them. Of all plans of sewage disposal the system of sewage irrigation over meadows seems the most feasible, and to possess the maximum of advantages with the minimum of drawbacks. By the different systems of filtration and sewage of meadows combined, there seems a prospect of getting rid of sewage in such a manner that the fluid shall fertilize the land and, leaving there its faecal matters, return through the purifying soil to the river a fairly pure water. In all large plains studded with hamlets and towns, the contamination of water with sewage, in spite of everything yet known, is such that filters in private houses are desirable.

The salient features of public hygiene above dealt with are by no means complete. The possible lines of improvement that may be effected in the most important phases of public health work have only been indicated. I have only attempted to point out the supreme necessity of a healthy interest in the cause of progressive sanitation, which in a nutshell connotes all that stands for progress and civilization in national polity. The recent triumphs of Sanitary Science in the Russo-Japanese War and Panama Canal will not fail to inspire civic authorities everywhere with legitimate hopes as to the propriety of a pre-eminent place being given to sanitary improvements in the programme of civic work.

Ideals of Local Self-Government, Town Planning, and Architecture in Ancient and Modern India.

III Town-Planning and Civic Ideals in Kautilya's Artha Sastra

[By K S RAMASWAMI SASTRY, B A , B L]

KAUTILYA directs in Chapter II of Book II that the King shall make provision for pasture grounds on uncultivable tracts¹ Pasture lands, plains, and forests may be availed of for grazing cattle² Kautilya gives also elaborate rules to prevent the destruction of pasture lands, fields, and roads³ Pasture lands are the source of cows, horses, and camels to draw chariots⁴ In modern times we have only insufficiently recognised this great duty, and our future progress depends on our giving due place in our plans to it and to scientific forestry so that neither alone may be unduly attended to to the ruin of the other Mr Narendia Nath Law says

“ It is a noteworthy fact that the importance of live-stock to India, pre-eminently the country of agriculture, was then fully realized, and special care was taken by the Government for their healthy growth and improvement Even at the present day Indian agriculture has been held to be suffering much from want of proper grazing grounds and commons for cattle and of a proper supply of fodder, but in Chandra Gupta's time we find a special department to provide for pastures and grazing grounds for a proper supply of fodder and for the welfare of live stock in general ”⁵

I may quote here the following passage from the Imperial Gazetteer (new edition)

¹ Shama Sastri's Translation, page 54
² Do do page 219
³ Do do, pages 219 220
⁴ Do do, page 275.
⁵ Studies in Ancient Hindu Polity, page 17

"In the deltaic areas and in the rice-tracts generally, the cattle are miserably weak. Grazing lands are here limited or totally wanting. General improvement is hopeless without assured fodder supplies"¹

In Chandia Gupta's time there was further a register of cattle kept by the superintendent. The state further fixed the scale and standard of diet normally necessary to keep up the health, vigour, and working capacity of all live stock.² There were various rules regarding the milking of cattle and the standard of dairy produce of all kinds.³ Also, animals like goats and sheep were shorn every six months, and their wool was made over to the superintendent.⁴ I must refer here to a very important rule as to pasture lands. The same forest was ordered not to be used as pasture for the cattle of neighbouring villages and towns throughout the whole year. Cowherds shall graze the herds in forests which are severally allotted as pasture grounds for various seasons.⁵ Mr. Narendranath Law says "Thus a system of rotation was introduced by which the pastures were kept up unimpaired, with their resources unexhausted by continuous use."⁶ He says further

"Pastures were generally opened in forests, in uncultivated tracts, and in intermediate areas between places infested by wild animals, thus promoting at the same time the reclamation of waste lands. There were thus several pastures in a locality, and it was the business of the herdsman to see which of them would suit the cattle under his charge."⁷

The great author and statesman then proceeds to describe the means of communication connecting villages with villages and villages with towns. This is a very important

¹ Volume II, pages 77-78

² Narendranath Law's *Studies in Ancient Hindu Polity*, page 22

³ Do do page 24

⁴ Do do page 26

⁵ Shama Sastri's *Translation*, page 161

⁶ Narendranath Law's *Studies in Ancient Hindu Polity*, page 28.

⁷ Do do pages 28-29

branch of town-planning and local and municipal administration Mr Nalendra Nath Law says —

“Considering the vast extent of the empire of Chandra Gupta, embracing as it did the whole of Northern India from the Bay of Bengal to the Arabian sea, an area wider even than that of British India, it is evident that the machinery of Government by which the administration of this mighty empire was carried on was highly elaborate and developed, the product of evolution through centuries. It implied the existence of all the principal factors on which depends the efficiency of such governments, viz, a well-disciplined army of sufficient strength, a well-organized system of administration, and a well-developed system of communication by which the heart of the empire was brought into constant and vital connexion with its distant and various parts”¹

“Kautilya regards the routes leading to the South as more important than those leading to the Himalayas, for while the latter brought to market the supply of blankets, skins, and horses, the former facilitated the supply of such valuable commodities as diamonds and other precious stones, pearls, gold and conch shells, of which Southern India was the noted home for ages”²

He says further

“Thus Kautilya understood very well the economic as well as the political importance of proper means of communication”

Roads and trade routes were classified (1) according as they were used by beasts of burden, men on foot or in conveyances, and (2) according to the destinations they led to³. The king's highway (*Rajamarga*) was four dandas or 32 feet broad. Kautilya says that demarcation of the ground inside the fort shall be made first by opening three royal roads from west to east and three from north to south⁴. Chariot roads, royal roads, and roads leading to Dionanukha, Sthanīya, country parts, and pasture grounds shall each be four dandas (24

¹ Narendra Nath Law's Studies in Ancient Hindu Policy, pages 68-69

² Do do page 70

³ Do do. page 71

⁴ Shama Sastri's Translation, page 60

feet) in width¹ Roads leading to Sayoniya,² military stations (Vyuha), burial or cremation grounds, and to villages shall be eight dandas in width Roads to gardens, groves, and forests shall be four dandas Roads to elephant forests shall be two dandas Roads for chariots shall be five aratnis (7½ feet) Roads for cattle shall measure four aratnis, and roads for minor quadrupeds and men two aratnis³ Mr Law adds "It should be noted that these roads took their names from the principal uses for which they were meant It must not be thought that a road for the purpose which its name implies was not put to any other use for which it was fit"⁴ Besides the aforesaid roads there was also distinguished a चक्रपथ (cart track) which admitted of a larger volume of traffic than the *Padapatha* and the *Manushyapatha* (2 aratnis or 4 feet wide) meant for pedestrians only The *Rashtriapatha* (4 dandas or 32 feet wide) was the road leading to the districts Mr Law says "The free flow of traffic along the established roads and trade routes was naturally one of the cares of the state, and all interference with it was punishable Suitable fines were imposed for blocking passage, which varied with the importance of the roads"⁵

In this connection it will be of interest to learn that there were six varieties of chariots for different purposes There were also the *Laghuyanam*, a small cart, the *golingam*, a cart of medium size drawn by bulls, and the *sakata* or big cart There was also the palanquin (*sibika*) Mr Law says "There were rules for the driving of vehicles to ensure the security of the passers-by"⁶

¹ Shama Sastri's Translation, page 60

² Sayoniya has been interpreted by Mr Law as meaning fields under cultivation

³ Do do page 60

⁴ Narendra Nath Law's Studies in Ancient Hindu Polity, page 72

⁵ Do do do page 75

⁶ Do do do page 78

It is further clear that great care was taken for repairing the roads, and that favour was shown to the labourers by exempting them from taxes¹ It is also of interest to learn that "the supply of water and shade was one of the concerns of Government"² Mr Law says "Trees were planted along the roads, and water-storages were set up, ministering to the comfort of passers-by There was also provision made by hotel-keepers for the supply of food and resting-place to travellers"³

I may refer here briefly to waterways and ships and boats, as waterways were as carefully looked after as roads Waterways were naturally prominent in India as the land of rivers, and water carriage is cheaper than carriage of merchandise by road But as Kautilya points out, water routes involve greater risks than land routes Water route is liable to obstruction, not permanent, a source of imminent dangers, and incapable of defence, whereas a land route is of the reverse nature⁴ Of water-routes, one along the shore and another in mid-ocean, the route along and close to the shore is better, as it touches at many trading port-towns, likewise river navigation is better, as it is uninterrupted and is of avoidable or endurable dangers⁵ Thus Kautilya knew river and canal navigation as well as ocean routes (नौगमनपथ) Ships and boats suited to inland and marine navigation were known Kautilya makes mention of *Samyatyāh nāvah* (संयत्या नावः) or ocean-going vessels, of boats used for pearl-fishing, of *Mahanāvah* used in the large rivers navigable at all seasons, of royal barges, of small boats meant for use in shallow rivers, of private ferry-boats, and of pirate ships and boats (*Himrikah*) Mr Narendranath Law says "The admiralty regulation was that they (pirate ships and boats) should be pursued and destroyed

¹ Narendranath Law's *Studies in Ancient Hindu Polity*, page 78

² Do do page 78

³ Do do pages 78-79

⁴ Shama Sastri's *Translation*, page 367.

⁵ Do do page 367

whenever they were found. The same regulation applied to the ships and boats of an enemy's country when they crossed its limits and also to vessels violating harbour rules"¹ The captain of a ship was called the *Sāsaka* (शासक), and the steersman the *Niyamaka* (नियामक). There were sailors who had to perform various duties. Kautilya speaks also of bridges of the ordinary type, bridges of boats, and bridges formed by elephants standing in a row. The king had a superintendent of the admiralty department (*Ndvadhyakha*), a superintendent of ocean mines (*Khanyadhyaksha*), and a superintendent of ports (*Patharādhyaksha*). The Empire of Chandragupta had extensive trade with distant lands. The *Aithasastri* speaks of *Pāravishayikāh*, *Sāmudrāh*, *Sārthayānapāthianī*, etc., and refers to Burma, China, and Ceylon. Mr. Law says "There are mentioned many other names of distant countries the products of which were brought into the Empire by the means of intercourse that were established"²

From roads and waterways we naturally go to the subject of tolls. The superintendent of tolls shall erect near the large gate of the city both the toll-house and its flag facing either the north or the south. When merchants with their merchandise arrive at the toll-gate, four or five collectors shall take down who the merchants are, whence they come, what amount of merchandise they have brought, and where for the first time the seal-mark (*abynanamudra*) has been made on the merchandise³. The rules as to letting in certain goods free of toll show the wisdom and refinement and spiritual character of the ancient Hindu civilization. Commodities intended for marriages, or taken by a bride from her parents' house to her husband's, or intended for presentation, or taken for the purpose of sacrificial performance, confinement

¹ Narendra Nath Law's *Studies in Ancient Hindu Polity*, page 88

² Do do, page 87

³ Shama Sastri's *Translation*, page 137

of women, worship of gods, ceremony of tonsure, investiture of sacred thread, gift of cows, any religious rite, consecration ceremony, and other special ceremonials shall be let off free of toll¹ Whatever causes harm or is useless to the country shall be shut out, and whatever is of immense good as well as seeds not easily available shall be let in free of toll² Tolls (*stika*) were collected also at harbours (*kshetra*) where ships touched I do not think it necessary or useful to state here other provisions in regard to tolls as found in Kautilya's famous work

We may now take up the building of forts after considering villages, roads, and tolls, because the city and the fort are the centre for the various villages Kautilya says that forts were to be erected on all the four quarters of the boundaries of the kingdom There are various provisions in the work as to the ditches, the ramparts, and the parapets of forts³ Kautilya then lays down rules in regard to the construction of the king's palace and the residence of the four castes I have already referred to the nature of the roads In the midst of the houses of the people of all the four castes and to the north from the centre of the ground inside the fort, the king's palace facing either the north or the east shall be constructed occupying one-ninth of the whole site inside the fort⁴ Royal teachers, priests, sacrificial place, water reservoir and ministers shall occupy sites east by north to the palace Royal kitchen, elephant stables, and the store-house shall be situated on sites east by south On the eastern side, merchants trading in scents, garlands, grains, and liquors, together with expert artisans and the people of Kshatriya caste shall have their habitations The treasury, the accountant's office, and various manufactories shall be situated on sites south by east The store-house of forest produce and the arsenal shall be

¹ Shama Sastri's Translation, page 187

² Do do page 188

³ Do do pages 56 60

⁴ Do do page 60.

constructed on sites south by west To the south, the superintendents of the city, of commerce, of manufactories, and of the army as well as those who trade in cooked rice, liquor, and flesh, besides prostitutes, musicians, and the people of Vaisya caste shall live To the west by south, stables of asses, camels, and working house, to the west by north, stables of conveyances and chariots To the west, artisans manufacturing woisted threads, cotton threads, bamboo-mats, skins, armour, weapons, and gloves as well as the people of Sudia caste shall have their dwellings, to the north by west, shops and hospitals, to the north by east, the treasury and the stables of cows and horses To the north, the royal tutelary deity of the city, nonsmiths, artisans working on precious stones, as well as Brahmans shall reside In the several corners, guilds and corporations of workmen shall reside¹ In the corners, the guardian deities of the ground shall be appropriately set up Likewise the principal gates such as *Brahma*, *Andra*, *Yama*, and *Sandapatya* shall be constructed, and at a distance of 100 bows (108 angulas) from the ditch on the countescarp side places of worship and pilgrimage, groves and buildings shall be constructed The court and the offices of the ministers shall be built in a separate locality Provided with separate accommodation for men and women kept apart and with many compartments well-guarded, a jail shall also be constructed (Kautilya, page 64) Guardian deities of all quarters shall also be set up in quarters appropriate to them Either to the north or the east, burial or cremation grounds shall be situated, but that of the people of the highest caste shall be to the south of the city² Families of workmen may, in any other way, be provided with sites befitting their occupation and field work. Besides working in flower-gardens, fruit-gardens, vegetable-gardens, and paddy-fields allotted to them, they shall collect

¹ Shama Sastri's Translation. page 61

² Do do page 62

grains and merchandise in abundance as authorised¹ There shall be a water-well for every ten houses² The wisdom of this provision is very apparent and well may our modern municipalities take a lesson therefrom in places where an excellent pipe system is impossible for many reasons Kautilya says further that oils, grains, sugar, salt, medicinal articles, dry or fresh vegetables, meadow grass, dried flesh, hay stock, firewood, metals, skins, charcoal, tendons, poison, horns, bamboo, fibrous garments, strong timber, weapons, armour, and stones shall also be stored in the fort in such quantities as can be enjoyed for years together without feeling any want

(To be continued)

Town-Planning in Municipal Areas.

Suggestions for improving the housing conditions in villages and small towns *

[BY A E MIRAMS, CONSULTING SURVEYOR TO THE GOVERNMENT OF BOMBAY]

THE problem of efficiently housing the poorer classes is undoubtedly one of the most serious social problems of the present day That this is, and has been, receiving the earnest attention of Government and its officers is of course evident from the numerous improvement schemes which are constantly being dealt with and towards which handsome grants have been made Two notable features of the present day aspect of the question are --

(1) the great increase in the amount of detailed information which is available as to the economic conditions of the people, and

¹ Shama Sastri's Translation page 62

² Do. do page 62.

³ Do. do page 62

* From a letter addressed by Mr Mirams to the Government of Bombay The Government ordered Mr Mirams' letter to be communicated to all Municipalities, and District and Taluk Local Boards

(2) the unmistakable signs of a more general awakening of the local municipalities to their responsibilities in the matter

The problem resolves itself into five main heads —

The first is concerned with the maintenance and improvement of existing houses,

the second, with the provision of new houses,

the third, with the clearing and improvement of unsuitable areas,

the fourth, the provision of new arterial as well as district-traffic roads, and

the fifth, the improvement of existing roads

The passing into law of the Town-Planning Act of 1915 marks an enormous advance in the amelioration of congestion, and the fourth and fifth points, and perhaps to a lesser extent the third, are directly influenced thereby. The present evils of our villages and small towns cannot, as in the case of most European towns, be said to be the result of modern growth and rapid industrial expansion, but rather to the uncontrolled development in the past, and the almost complete absence of by laws and regulations, governing the siting and construction of houses, although it is true that a strong economic and moral incentive is more effectual than official regulations.

To ensure good housing it must be made profitable to the owner. The economic rent in the villages is, however, not only limited, and it can only be by the strictest economy in the materials that a structure suitable for human habitation can be put up to show an annual return commensurate with cost.

The ideal house would of course be built of either stone or brick, but in many parts of the Presidency this would be quite impracticable. The cost would be altogether prohibitive. This being so, would-be reformers have given up the situation as hopeless and the ordinary 'wattle and daub' but

has continued on exactly the same lines as it has for centuries. I am convinced, however, after a careful study of the question all over the Presidency, that an improvement can be effected, which will mean an enormous increase in the comfort, well-being and sanitary amenities of the people, if they were given a helping hand.

Municipal authorities might construct sample houses somewhat on the lines suggested in the Appendix hereto (p 307)

Such houses might be of two or three different types, from the dwelling necessary for the very poorest to something rather better. Light and air space would naturally be considered. With such examples before them the villagers would have an ideal to aim at.

He would no longer be satisfied to grovel along in filth and squalor. The surroundings of the houses could be made attractive by the planting of trees. The æsthetic might be encouraged by a hundred and one expedients familiar to men who have a mind to improve the environment of the poorest classes. The offering of prizes, which might take the form of an annual money reward for the best kept house-front and compound, would be an incentive to the occupiers to cultivate tidy and cleanly habits. Once get the spirit of friendly rivalry and emulation into the people and wonders would be wrought. This is not pure theory, and cannot be brushed aside as idealistic but impracticable. These things have been done in other countries and can be in this. I have seen wonders wrought in an African Negro village built of mud in three months by such an effort as I have described.

Dealing with the treatment of insanitary areas, municipal authorities should realize that they are in the position of a doctor treating a cankerous growth. He does not trim a little bit off here and there. The whole thing must come away. So it is with an insanitary area. It does *some* good to make a road through such a quarter, but the road does not get rid of the insanitation except immediately on either side of it.

The bold course is the best and the cheapest in the end. Authorities should seek to make the improvement of an insanitary area pay for itself as far as possible. By careful and judicious planning and the reservation of road frontages for controlled development a great deal can be accomplished in this direction. The clearance of an insanitary area and the provision of sites for the persons dishoused is without question a public purpose.

Almost invariably the converting of back land to front land by means of new roads increases the value of the land and it is here that the municipalities have an opportunity, not of making a profit, but of recouping some of the cost of the scheme. If the position of the area is such that it is not all required for an open space, then a considerable portion of it should be designed to rehouse the people displaced. It is obviously wrong then to entirely *clear* the whole area at once. It should be, of course, comprised in one notification, if being dealt with under the Land Acquisition Act, to prevent values going up as the result of the improvement of a part, but only a section at a time should be demolished, and thus the tenants of the remainder will have an opportunity of finding accommodation on the new sites. If the whole is cleared, then the people turned out cause overcrowding and consequent insanitation in other parts of the town and rarely come back again. As to which part of an area should be cleared first is a question the answer to which will differ in each scheme. It is a matter of great importance, however, and should be carefully thought out and expert advice sought.

This brings me to the fourth and fifth heads, the provision of new arterial and non-traffic roads and the improvement of existing roads. As in this note I am only dealing with the development of the villages and smaller towns no good purpose would be served by discussing the intricacies involved in big schemes. It only remains to point out that the Bombay Town Planning Act has put far reaching reforms within the reach of every municipality. The creation of desirable housing

areas on the outskirts of our towns will tend to decrease overcrowding in the towns, and it is the provision of such areas that the Act aims at. Put very briefly, a municipality may make a scheme, subject to the sanction of the Governor in Council, for the planning of any undeveloped area within its jurisdiction and thereafter may in accordance with the provisions of the Act provide for main and subsidiary roads to be constructed which will meet the requirements not only of the present but of the future. The value of any land taken for roads, etc., shall be credited to the owner in an account to be opened for the purpose. Plots of land included in the area will be given road frontages and by a principle of give and take they will be given a good building shape, as far as possible with road frontages.

The value of the plots in their original state (but after land has been taken for roads) will be considered as against the improved value of the plot after it has been given a good shape and position. The difference between the two values will be the value due to the scheme. The whole of this improved value is of course in the pocket of the owners of the land, and all that they can be called upon to contribute towards the cost of the scheme is such an amount as will be equal to *half* this increase in value. It may be that it will only be 10 or 15 per cent or it may be 40 per cent. In some schemes it will be very little. In the case of an owner who has sold land for the roads the amount he will contribute will be debited to his account. It will be seen that what really happens is that each owner of land is being made a present of something for nothing. In the case of an owner whose land has increased in value by Rs 1,000, all that the Act says is that he should be asked to contribute *not more than half* that sum towards the expenses of the scheme. He would be a foolish man who refused Rs 1,000 because he had to pay someone else Rs 500 out of it.

In this way the expenses of the scheme are met, and if well conceived, many schemes will not cost the municipalities

anything at all and the result will be the development of a healthy and beautiful suburb

The main object of this note is to encourage municipalities to take an interest in the provision of healthy living conditions for the poorest classes. Incidentally the question of traffic and subsidiary roads should be thought of. Villages on main roads should be specially considered from the point of view of widening the main road. This can often be cheaply done by judicious setting back of the frontages when rebuilding is contemplated or as occasion offers.

I have only dealt with the matter in more or less general terms, as each district will have its own peculiarities. The selection of the healthiest site for development, the method of laying out of the site, the constructional difficulties, are all subjects for special treatment, but with the view of stimulating the municipal authorities in the matter, Government might consider it desirable to have a copy of my suggestions circulated to the municipalities and to direct them, if they desire further information, to communicate with me through the Collector of their district.

APPENDIX *

A suggestion for housing accommodation for the poorest classes

Walls to be of well puddled mud and country timber with a surface of $\frac{1}{2}$ inch plaster on the exterior. The roof could be of

* With regard to the Appendix, the Government observed —It must be noted that the timber and mud building suggested is not necessarily the form of construction best suited to the particular conditions and requirements of every part of the Presidency. In many localities the use of sun-dried bricks and country tiles would be preferable and also more economical. The use of thatch as a roof covering is also to some extent open to objection on account of the attendant risk from fire. But these observations do not detract from the utility of the principle which is advocated in the letter, namely that of the desirability of the erection of houses, designed on hygienic and economic lines and constructed to suit local conditions and requirements, which will serve as models for the dwellings of the people. It is not essential that the construction of the model houses should be undertaken by the local body itself. It would probably be more economical to induce an enterprising builder to erect the houses, as he would know best what the public require and can be relied upon to build cheaply. The co-operation of local architects and masons should also be secured, for they can do much to influence their clients.

country battens and corrugated iron, thatched for coolness. Ample window and door space should be provided. Such a dwelling with two rooms 10 feet \times 10 feet could be erected in the mofussil at an average price of $1\frac{3}{4}$ anna per cubic foot, or a total cost for 3,600 cubic feet of Rs 400.

Agricultural land adjoining the villages* is worth roughly in an average number of cases Rs 300 per acre. Twelve houses might be allowed to a gross acre (i.e., including roads). If 25 per cent is allowed for roads, then each house would have an area of approximately 2,722 feet. This would allow of a plot approximately either 52 feet square or 30 feet \times 90 feet according to plan. I do not recommend that the plot should necessarily be enclosed as the result would often be unkempt and insanitary compounds, but the area unbuilt on should form part of a common garden forecourt, with some space at rear of building. It may be asked if this is practicable from a financial point of view. Assuming the two-roomed house at Rs 400 and land at Rs 300 per acre, the rent would work out as follows —

	Rs per annum,
† 5 per cent on Rs 400	20
12 houses per acre thus $\frac{1}{12}$ of Rs 300 for	
land = Rs 25, at same interest, viz., 5 per cent $1\frac{1}{4}$	
	<u>21$\frac{1}{4}$</u>

or well under Rs 2 per month

* With regard to the development and improvement of villages the Government observed — The scope for preventive and remedial action is naturally much restricted by the absence of building control in respect to land in private occupation. But vacant land forming part of the village site generally belongs to Government, and in regard to such land the Collector has full control. Before disposing of building plots he can cause roads and gullies to be demarcated, and the plots themselves can be allotted in regular and systematic fashion. Simple building conditions can be imposed such as the requirement of a vacant margin between the intended building and the whole or portions of the perimeter of the plot. The provision of a vacant space at the back and the front of the building is especially desirable, as it not only improves the sanitary conditions of the house but also prevents encroachments on the roadway in the form of door steps and verandas. A contribution towards the construction of the road on which the plots about can also be made a condition of the grant. By taking action on these lines the Collector is in a position to ensure that any future expansion of the village shall proceed on orderly lines, tending to the establishment of good housing conditions and providing for sufficiently wide and properly aligned thoroughfares.

† 5 per cent should cover interest and sinking fund charges

If this is too much for a particular man to pay, then the size of one of the rooms could be reduced. It should further be borne in mind that when the villager himself does most of the labour (under supervision) the cost to him would be very much less. And after all, the main idea is to show the villager how it should be done, and then for the municipality to insist on its being so done in the future.

Rangoon.*

The Plan of the City

I should like to congratulate Burma on having in Rangoon what will one day undoubtedly be one of the finest and most modern cities in the East. To a man who like myself has known Calcutta, Bombay, Madras and other big cities in India, the first sight of Rangoon was impressive. Rangoon cannot yet rival Calcutta or Bombay but it has great potentialities for the future. It is, I believe, the only big city in India which has been laid out on a scientific plan. It was laid out on the chess-board plan in 1853—an auspicious date for in that year Haussmann started his great work in Paris. The lay-out is a system of 100 feet roads running North and South intersected at right angles by similar roads running East and West with due regard to the prevailing winds. North and South interior roads run through the blocks. The lay out of Rangoon was the work of a subaltern of the Bengal Engineers, Lieutenant A Fraser. His proposals were modified in certain matters not, as it seems to-day, to the advantage of the plan. I am told that Lieutenant Fraser's name is preserved in Fraser Street. It is a name which should ever be remembered in Rangoon, and on some occasion hereafter we may perhaps have the chance of connecting it with some more conspicuous memorial. In talking of Rangoon and its future, may I say to the City Fathers of Rangoon through their representatives here that their responsibility is as great as their opportunity. Massive buildings are arising, will it not be

* From the address of His Honour the Lieutenant Governor of Burma to the Legislative Council, Burma.

possible, as their number will increase, to regulate them somehow in regard to taste and style in certain reserved areas such as the Strand Road Upper Phatic Street, Merchant Street and Soolay Pagoda Road, especially round Fytche Square? I throw it out as a suggestion that there might be an architectural zone and for its regulation a town embellishment sub-committee of the Municipal Committee with the Government Architect as an advisory member

Local and Municipal Administration during 1914-15.

[Bihar and Orissa]

MUNICIPALITIES—During the year under review the simplification of accounts and the amendment of the Act engaged the attention of Government. The number of Municipalities continued to be 55 and the number of rate-payers was 17·5 per cent of the population. The receipts during the year fell from 41·63 lakhs to 33·31 lakhs but the charges rose from 33·28 lakhs to 40·62 lakhs. The decrease in the former was mainly under grants and contributions owing to the curtailment of Government grants and the increase in the latter under extraordinary and debt due to the investment by the Patna Municipality of the Government grant of 6 lakhs paid to it for its water-supply scheme.

The bulk of the revenue was derived from the tax on houses and lands and the conservancy rate and the main heads of expenditure were conservancy, medical relief, water-supply and drainage. The expenditure on education formed 3·1 per cent of the total expenditure and His Honour the Lieutenant Governor has noticed with satisfaction that all the Municipalities spent more than 3·2 per cent of their ordinary income on primary education.

The collection of Municipal dues is generally neglected and the outstandings were large in eight municipalities. The

Lieutenant Governor observes that the lack of supervision over the collection staff was in many instances responsible for the misappropriation of public money and for the poor results achieved in the realization of municipal dues.

The standard of efficiency attained by Councils in this Province cannot be said to be very high.

LOCAL BOARDS—Eighteen District Boards, forty-one Local Boards and twelve Unions were working during the year and administered Rs 1,17,33,960 against Rs 97,71,158 in the previous year. The total expenditure was Rs 88,11,285 against Rs 63,42,071 in 1913-14. Nearly half the income of the year was derived from provincial rates (51 lakhs). The charges are mainly made up of 14.33 lakhs under education, 5.68 lakhs under medical relief, 2 lakhs under water works, 11.27 lakhs under new roads and 42.49 lakhs under other public works.

The audit procedure was simplified during the year but the amendment of the Act was still under the consideration of Government. The Lieutenant Governor draws the attention of the Boards to the irregular practice of drawing the money allowed for a work just before the close of the year and holding it in deposit merely with a view to avoid lapse of the grant. He has also noticed with regret the fact that District Boards do not delegate their functions to Local Boards and thus avail themselves of the full benefit of the existence of these boards.

Nearly a sixth of the expenditure was devoted to education but it is observed that most of the boards have again failed to spend the prescribed minimum on education and medical relief. As this is the second year in succession in which failure in this respect is noticed, the Lieutenant Governor has directed the Commissioners of Divisions to submit a report in the matter and to see that in the case of education the unspent allotments in the previous two years should be earmarked for expenditure under that head in subsequent years. The

outlay on arboriculture was very small and the Lieutenant Governor rightly remarks that the importance of expenditure under this head is not sufficiently realized by the boards as, apart from adding to the comfort of the passengers, these trees will eventually prove to be a valuable source of income

The closing balance was 24.69 lakhs being made up in several cases of the unspent allotments under the various heads. The need for drawing up regular programmes and working them up is being emphasized and the Government add the warning that no board which fails to put its available funds to the best possible use but has an unnecessarily large closing balance can claim special assistance from them.

[Central Provinces and Berar]

DISTRICT BOARDS.—As observed by the Local Government, the year under review was one of small but encouraging progress in many directions. We regret to observe that in these Provinces there are very few indications of any increased growth of public interest. No less than 93 out of a total of 830 meetings held proved abortive for want of a quorum, and the provincial average non-official attendance fell from 46 to 44. The Chief Commissioner, we are glad to observe, is taking action for removing from Boards and Councils those who realize only the privileges and not the duties of their position.

The closing balances have increased in all but eight districts. The Local Fund Engineer Scheme introduced into this Province has not yet worked well, and Government trust that early steps will be taken to utilise these balances in accordance with definite and well-considered programmes of improvements.

The total expenditure on education rose from Rs 6,79,000 to Rs 7,48,000 in the Central Provinces and from Rs 3,47,000 to Rs 3,71,000 in Berar. There has been regrettable delay in utilising the grants allotted for the improvement of school accommodation. A special grant has been given for starting schools for low caste boys, and the experiment of

opening night classes for the children of agriculturists has been initiated in the Neibudda Division

Large sums have been spent on medical and sanitary works. Improvement of the water-supply, rural conservancy and sanitation are receiving the attention which they deserve

The expenditure on Civil works increased from Rs 13,86,623 to Rs 17,23,113. Definite programmes concentrating attention upon definite lengths of roadside avenue have been drawn up in all districts and good progress in this direction has been made during the year under review

With regard to municipalities, there has been no change in the number of municipalities, during the year under review, the only change in constitution was in Wardha where a new Committee came into existence at the beginning of the year. There has been a poor attendance of nominated official Municipal Councillors. There has been no interest taken in most of the elections, which the Commissioner attributes to the system of retirement by rotation introduced in 1908. This system is being done away with and the old system of triennial general elections is being introduced.

Excluding Government contributions, the real municipal income during the year was Rs 26,55,151 against Rs 28,76,351 in the preceding year, the fall being chiefly under the head 'octroi,' due to the effects of the war.

Expenditure during the year amounted to Rs 40,90,966. There was a large increase in the capital outlay on Water-works Schemes, while the amount spent on Drainage totalled Rs 3,19,400 against Rs 3,77,933 in the previous year. Rs 6,10,022 was spent on conservancy and sanitation. The relief of congestion is not receiving the attention it deserves. Town Improvement Schemes have been undertaken in several places, while steps were taken for holding a Town-planning Exhibition at Nagpur and other places. There is no lack of attention to the educational requirements of municipalities,

and we note with satisfaction that many school buildings owe their inception to private initiative

Speaking generally, there are, as observed by his Honour the Chief Commissioner, clear and ample indications of progress in the awakening of civic life

[Bengal District Municipalities]

IN reviewing the administration reports of the Bengal District Municipalities for 1914-15, the Government of Bengal observe that Divisional Commissioners and District Magistrates comment on the municipal administration of the year with tempered enthusiasm. They note the business methods of Sonamukhi, the quiet progress of Tamluk and Alambagh, the comparative cleanliness of Bubbhum, the enterprise and good management shown by Cossipoie-Chitpore and Garden Reach and the efficient administration of Darjeeling, Nator, Sheikpur and Kurseong. On the other hand, the municipalities of Uttarpala, Chandrakona, Maniktala, Bansberia, fared badly, faction being the cause of the feeble administration in the first three towns. The Baidwan, Bhadreswar, Jessore, Rampore-Bauleah and Seraganj municipalities experienced financial embarrassment owing either to inadequate funds, or mis-management of the available funds.

One hundred and eleven Municipal Councils administered 93.64 lakhs including the opening balance against 88.64 lakhs in the previous year, the increase being mainly under taxes and loans which was partly counterbalanced by a decrease under grants and contributions. The total expenditure also rose from 69.58 lakhs to 72.18 lakhs, but the increase is only nominal as it represents the investments made in savings banks.

The principal items of income were the tax on houses and lands (15.87 lakhs), the water rate (6.67 lakhs), the conservancy rate (10.70 lakhs) and the tax on persons (3.93 lakhs). The main heads of expenditure were conservancy (15.18 lakhs),

water-supply (7.85 lakhs), drainage (6.86 lakhs), other public works (8.29 lakhs), hospitals and dispensaries (3.53 lakhs), office establishment and collection charges (4.11 lakhs), lighting (3.34 lakhs) and public instruction (1.83) lakhs.

Collections were very fair being 94.15 per cent of the current demand but remissions were high. The Governor in Council puts down the disinclination of the municipal executive to resort to coercive measures as an injustice done to the punctual rate-payer and the poorer classes of citizens. The percentage of rate-payers to population in all Municipalities was 16.08 and ranged from 34.9 to 3.6.

It is gratifying to note that no municipality suffered from plague but the expenditure on medical relief and education was far from adequate. The municipalities of the Dacca Division especially displayed a lack of interest in hospitals which were too often housed in miserable buildings with little or no accommodation for in-patients. The expenditure on education formed only 2.5 per cent of the total expenditure and only 88 out of the 111 municipalities spent only 5 per cent or less of their income on primary education.



Dust Bin Problems*.

[BY D F FORD]

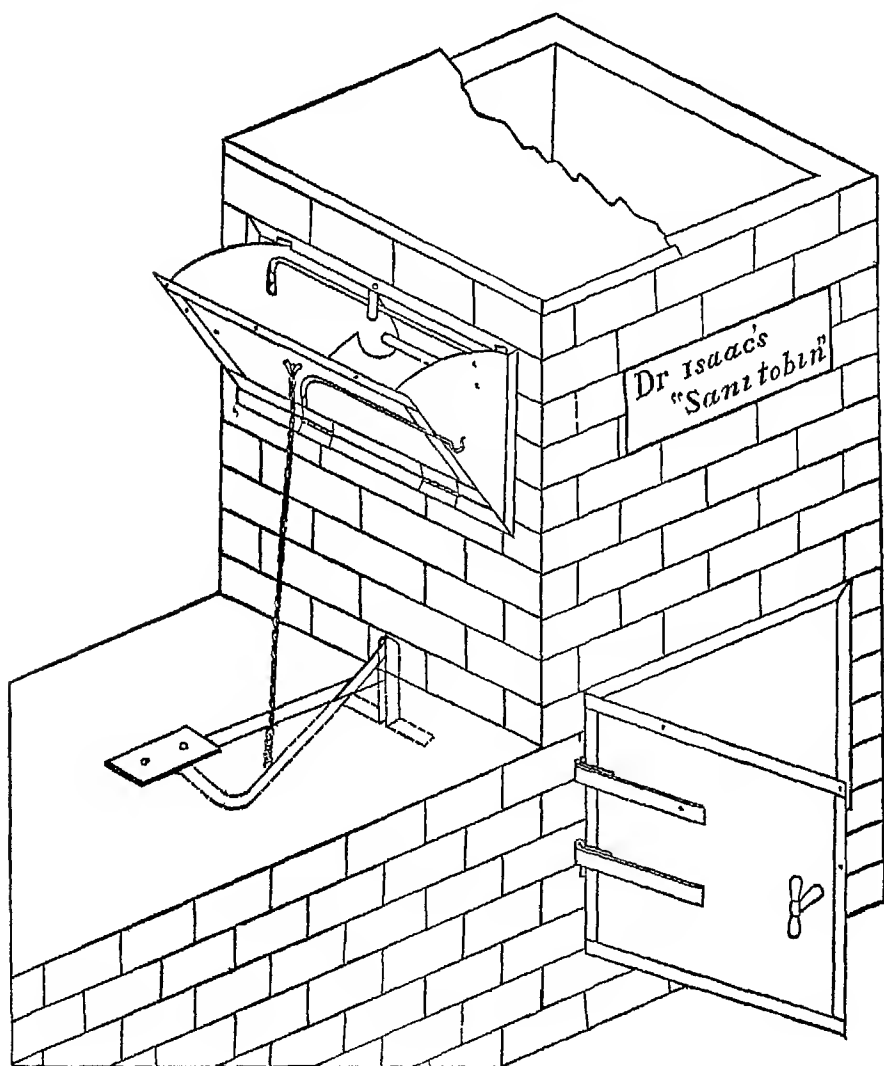
AN interesting record of the sanitary benefits which can be effected in our towns and villages by careful attention to the subject of domestic refuse is now available in the recently published *Return as to Scavenging in Urban Districts*, prepared by the Public Health Department of the Local Government Board

The problem of scavenging, at first glance, may possibly appear revolting rather than attractive, yet no other subject is more intimately connected with public health, and incidentally with public savings. In London recently, where the collection of refuse is weekly or bi-weekly, a medical correspondent pointed out that the public must understand that if they insist upon a daily collection of their household refuse they will drive death and disease from their homes, they will save the lives of their young children, they will be rid to a great extent of the fly pest, and they will actually save money as well.

How many people, for instance, voluntarily familiarise themselves with the methods of storing refuse which obtain in their particular district, whether in fixed ashpits (always more or less objectionable on account of the difficulties of thoroughly cleansing and emptying them) or in moveable receptacles? It would certainly seem as if the presence of ashpits in the near vicinity of dwelling houses was productive of no very serious loss of equanimity to the inhabitants of this country, since the *Return* informs us that 54 per cent of urban districts in England and Wales still adhere to this method of storing their refuse, with its invariable accompaniments of vermin and smells. Moveable receptacles for house refuse are less open to complaint, since these permit the contents to be thrown directly into the removal cart, and owing to

*Reprinted from the *Chambers's Journal*

Dr. Isaac's Sanitary
Intramural Bin



limitations of size, exact frequent emptying. But how many householders realize that unless *suitable* receptacles are provided, the same calamities which hover about the fixed ashpit will inevitably haunt the pathway of the insanitary bin? Section 157 of the Public Health Act (1875) enjoins that all moveable receptacles used for storing refuse shall be "constructed of galvanised iron, or other suitable impervious material of a sufficient strength and thickness, provided with suitable handles and a properly fitting rainproof cover, and of a capacity not exceeding two and a half cubic feet," yet the facility with which the consciences of the community evade this particular decree is accurately determined by the Return, which states that only 11 per cent of urban districts in this country are provided with sanitary dust-bins, the remainder, after ashpits have been disposed of, possessing only miscellaneous receptacles.

The type of removal cart, again, bears the very closest relationship to the public health, yet what degree of scrutiny does the average citizen bestow on the nature of the local tumbrel as it jogs relentlessly past his door? In Vienna, the domestic refuse from its two million or more inhabitants is collected by carts provided with special receptacles. All the dust-bins are covered square boxes of a uniform shape and size. These boxes are pushed into the receptacle of the cart, which is then closed by a lid and the box is uncovered and emptied by turning a handle without any dust escaping into the street. The example of the Austrian capital is doubtless a counsel of perfection so far as this country is concerned, but one would naturally assume that no community could possibly exist which did not enforce the provision of at least *covered* vehicles for the removal of house refuse, and these of a sufficient size and number to prevent overloading of the contents. Reference to the Return, however, assures us that we are not altogether correct in our surmise. Covered removal carts, it appears, are in use in only 63 per cent of the urban districts of England and Wales, the remainder of the

inhabitants being guilty of still adhering to the abhorred open vehicles. The writer of this article cherishes a vivid recollection of this latter type of removal cart in an ancient cathedral city. Eagerly shadowed by a ragged horde on the *qui vive* for 'droppings,' heaped to the skies with all manner of offensive items exhaling poisonous effluvia down every street, the winds of heaven wantoning amidst the garbage, and scattering impartially to all points of the compass dust, rags, feathers, and one's most intimate scraps of correspondence, thus this prehistoric equipage pursued its appointed route, the shadow of the venerable pile overhead imparting a touch of foison dignity amongst the dismal surroundings.

The utilisation of domestic refuse is probably a subject which attracts even less general attention than either its removal or storage. Yet to the utilitarian type of mind (and who is not an economist nowadays?) this problem is intimately connected not only with interest but with ingenuity. The remunerative disposal of house refuse, unfortunately, involves sorting, one of the most degrading and worst-paid trades, which, however, could speedily be robbed of its most objectionable features if householders would undertake to perform part of the process themselves. Mr J A Priestley, Sheffield's Cleansing Superintendent, is very emphatic on this point. He says "The sorting of refuse as at present carried out in many districts in London is very objectionable on sanitary grounds, but with present methods I do not see how any sorting process other than by hand is feasible. My own view is that the sorting ought to be rendered unnecessary by a separation of the usable and unusable classes of refuse at each house with a separate receptacle for each class. By this means, refuse which had any value would not be contaminated by refuse requiring destruction, and the sorting out into different classes would be robbed of its present objectionable features."

We are informed by the Return that the remunerative value of house refuse varies with its nature and degree. It is

generally assumed that where fish and animal offal abounds in sufficient quantity, it is a paying proposition to put down plant for its conversion into artificial manure

Waste paper, too often consigned to the flames, is another marketable item, being easily pressed into bales which the papermaker can work up again into a useful commodity. The value of tin-plate, however, has considerably decreased of late years. At one time it appears to have been worth eleven shillings a ton, and down to as late as 1911, Northampton's annual profits on tin-plate and solder alone amounted to nearly eight hundred pounds. The present decreased value of tin plate is owing in great measure to the small amount of solder now used in its general composition, and there is a general consensus of opinion that only a combined solder recovery and detinning process will ever make this commodity really profitable again. Galvanised and enamelled scrap metal is recognised as commanding a ready market anywhere, whilst bottle glass fetches from ten shillings to twelve-and-six a ton. Even ashes, clinker, and flue dust may be used up in the making of mortar, concrete flags, and disinfectant powder. The filter-beds at sewage works dispose of some of these residuals, whilst various attempts at brick-making are responsible for the rest.

Destructors play an important part in the utilisation of dust bin contents, but these, unfortunately, are only possible in rich and populous districts. When fitted with boilers for generating steam, destructors can also be used to make electricity, or to pump sewage, or for other machinery. The profits realised from the various by-products of the destructor reach quite fabulous sums in many of our large cities. Manchester's receipts in twelve months from old iron and tins have amounted before now to over one thousand pounds, the sale of waste paper has brought in one hundred and eighty-three pounds, and twenty-three pounds has been gained by the utilisation of clinker. In Glasgow, where a process is in operation to make artificial manure out of fish and slaughter-house

offal, the profits in 1914 from this source of revenue amounted to close upon eleven thousand pounds. At the destructor stations of this same city waste metal is automatically separated from clinker, and sold for nearly thirty shillings per ton. In Liverpool, some three hundred yards of flags are made every day for use in the various streets from clinker refuse.

Districts not possessing a destructor (and these are all too many, according to the Return) dispose of their house refuse in various limited ways. Towns on the sea-coast or tidal rivers frequently barge their refuse out to sea. In the country, farmers and market gardeners often receive a large proportion of the available house refuse from the towns and use it for manure. Sometimes the contents of dust bins are used to fill up marshes and excavations, but in far too many districts the refuse is merely 'tipped' at places sufficiently remote from human habitation. Yet, even a 'tip' has its mission in life, for at the end of three years the material of which it is composed becomes completely disintegrated, when it forms valuable manure for heavy soils, or can be used in brick-burning.

Co-operative House Building in Bombay.

IN our last issue, we referred to the zeal and enthusiasm of the Saraswath Co-operative Society which, through the kindness, sympathy and active support of the Hon'ble Mr. J. P. ONI, SH. Prabhashankar Pattani and Mr. B. W. Kissan, succeeded in its pioneer work—the completion of a large block of buildings for the use and enjoyment of its members. Through the courtesy of the Hon. Secretary we are now able to give the following descriptive details of the Society's new Buildings.

Description of the Society's Buildings, etc.

1. PLOT BUILT UPON—The plot of ground on which the Society's buildings are erected is situated at Gamdevi. It is taken from the Bombay City Improvement Trust on a lease of 999 years, which is practically permanent. Its area is 1,456 sq. yds. The scheduled price of this plot was Rs. 18-12 per sq. yd., but the Trust

at the instance of the Society reduced this rate to Rs 15 per sq yd. The price of the plot taken up is therefore $1456 \times 15 = \text{Rs } 21,840$ or say 22,000. The annual rent payable at $4\frac{1}{2}$ per cent p.a. on the price comes to Rs 980.

2 WORKS DONE ON THE ABOVE PLOT —The works done on the above plot consist of 3 main buildings and an out-house for the mali. The compound is being laid out into a garden surrounded by a wall with iron gates in front of each building. Electric installation has been fitted out for lighting all rooms and passages in the buildings and the compound. The 3 buildings together cost Rs 66,000 and the other works, viz., the out-house, the compound wall, the layout of the garden and the electric installation are together expected to cost not more than Rs 6,000.

3 AREA COVERED BY BUILDINGS —Each main building covers an area of $51' 3" \times 35' =$ nearly 199 sq yds and that covered by the out-house is $16' \times 12' - 6" =$ nearly 22 sq yds. The total area covered by the building is therefore $199 \times 3 + 22 = 619$ sq yds and that left open is 837 sq yds. The uncovered area is being laid out into a garden.

4 CONSTRUCTIONAL DETAILS —The buildings are three storeyed and of masonry walled construction, the thickness of the main walls being $18\frac{1}{2}$, 14, and 14 inches on the ground, first and second floors respectively. The flooring is made up of brick bat coba paved with cement patent stones. It rests in the case of the two upper storeys on one inch teak planks except in the portion covered by kitchen and bath rooms where the coba rests on Tandoor slabs placed on teak joints and also paved with similar slabs.

The arches on the front verandah are of 9 inches thick brick and lime mortar masonry and are supported on reinforced concrete pillars with ornamental caps of Poirebunder stone, and on the 2nd floor with a terraced roof supported on a lintel of Poirebunder stone with a parapet wall of the same material. The verandahs are provided with cast-iron railings.

The roof of the buildings is covered with Mangalore tiles on teak ceiling directly supported on teak purlins resting on king post trusses.

All the windows and the external doors are provided with glazed fanlights. The front and the return windows are provided with double shutters, venetianed externally and glazed internally, the rest of the side windows have single glazed shutters and the rear windows have single shutters partly glazed and partly venetianed. All the door shutters are panelled.

The privy accommodation is on full flushing system, the seat and the walls being paved with white glazed tiles.

The stair case is of teak, made fire proof with concrete and is provided with ornamental teak railings.

The timber used for the buildings is Moulmein teak and the plumbing and sanitary works are of up-to-date pattern.

5 DIMENSIONS OF THE BUILDINGS —The length and breadth of each building are 51' 3" and 35' respectively and the average height above the ground level to half way up the roof is 34' 6". The foundations are about 7 feet deep, the plinth is 2 feet above the level of the road, the ground and first floors are each 10' 6" high and the second floor is 8' 6" high to the tie beam and the roof 6 feet therefrom.

6 COST PER CUBIC FOOT —In estimating the cost per cubic foot two methods are adopted, according to one, the average height is calculated from half the depth of the foundations and according to the other from the base of the plinth. The height under the former method would be 38 feet and on the latter 34' 6". The cubic contents of each building under both methods would respectively be —

$$(1) 51' 3" \times 35' \times 38' = 68,172 \text{ cubic feet}$$

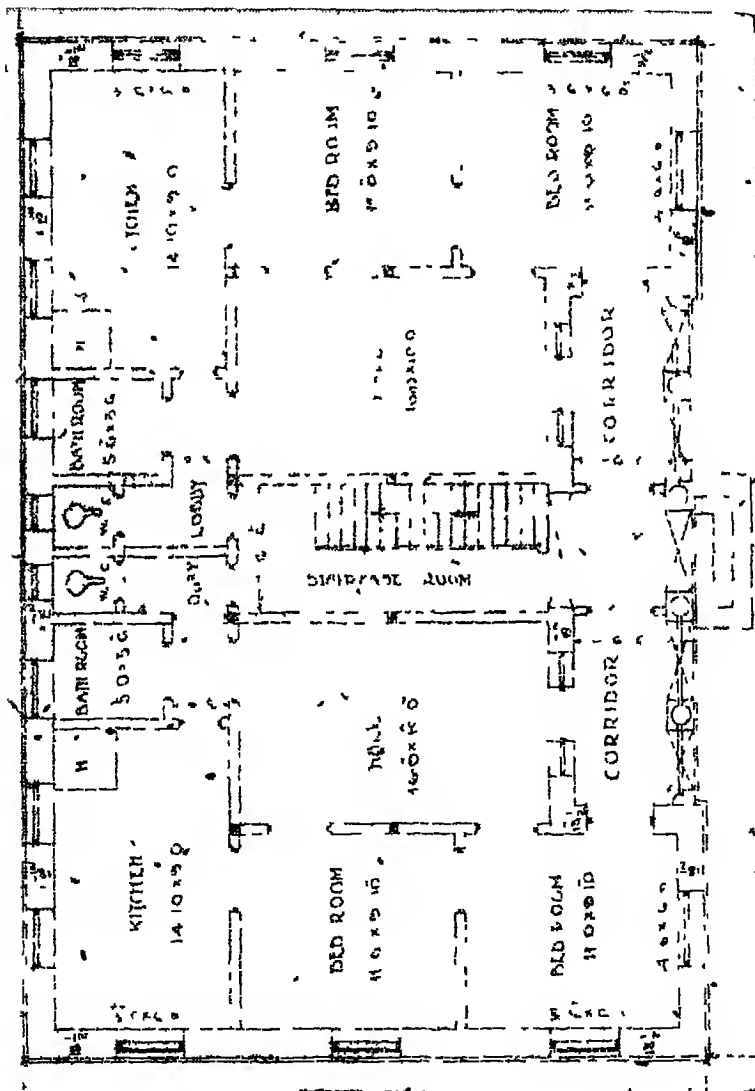
$$(2) 51' 3" \times 35' \times 34' 6" = 61,893 \quad ,,$$

The cost of each building including plumber's works but excluding electric installation being Rs 22,000, the cost per cubic foot on the former method would be annas 51 and on the latter annas 57 per cubic foot.

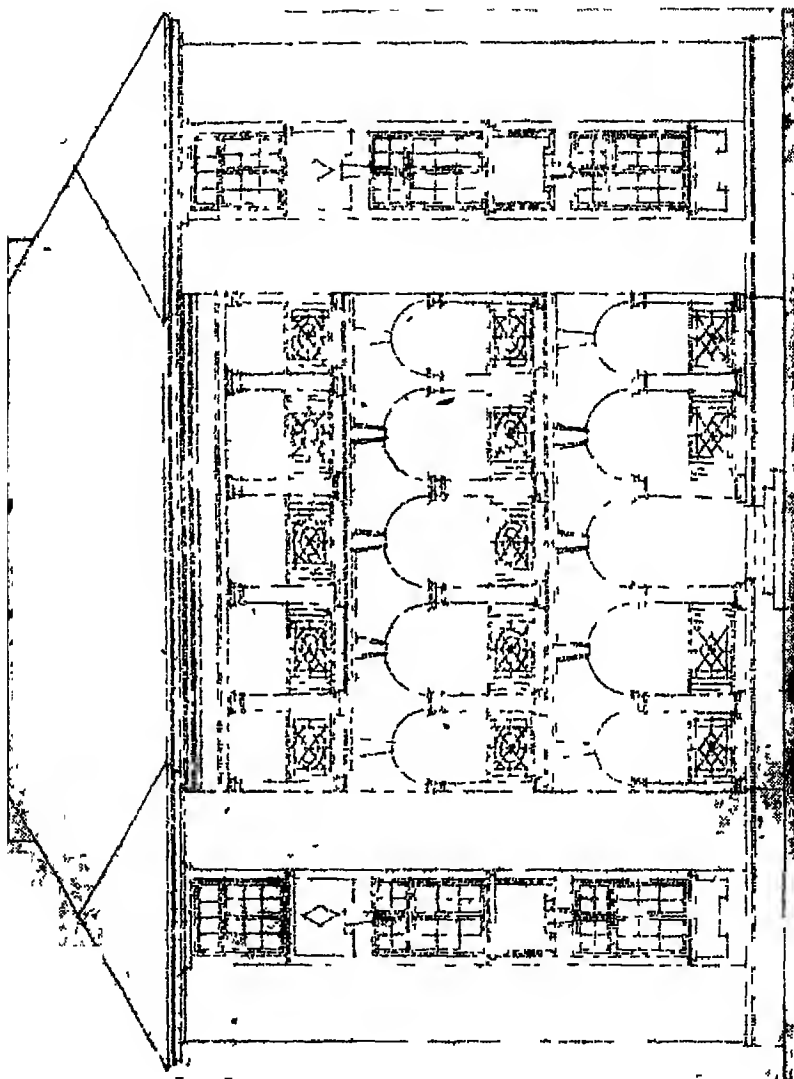
Details of Accommodation and Rents

7 DETAILS OF ACCOMMODATION —All the three buildings are similar to each other in every respect. Each of them consists

of a ground and two upper floors, with two independent tenements on every floor. The arrangements of the rooms can be seen from the following ground plan



*Illustration by courtesy of the Hon. Secretary of the Society
Ground plan of the Society's New Buildings*



*Illustration by courtesy of the Hon. Secretary of the Society
The Saraswath Co-operative Housing Society's New Buildings (Opened on 21st December, 1913)*

he accommodation in each tenement consists of 2 bedrooms, one hall, one kitchen, a verandah, a bathroom and a W C. Their size and area are given below.

Size and area of rooms, etc

Description	In the building actually constructed		In the building originally planned (Area same on all floors)
	Area on ground floor	Area on upper floors	
Hall	16 x 10 = 160	16 4 x 10 = 163½	15 x 12 = 180
Front Bed room	11 x 9 10 = 108½	11 4 x 10 2 = 115½	12 x 9-3 = 111
Rear Bed room	11 x 9-10 = 103½	11 x 10-2 = 112	15 x 9 = 135
Kitchen	14 10 x 9 = 139½	15 4 x 9 4 = 143	119-3 = 102
Verandah	10 x 6 = 60	10 x 6 6 = 65½	Nil
Bathroom	5 x 5 6 = 27½	5 x 5-10 = 29½	5 x 4 = 20
Lobby	8 6 x 3 = 25½	8 6 x 3 = 25½	8 x 3 = 24
Total area in sq ft 623		654	572

Only the area included in the tenement proper is shown above exclusive of the common passages and stair cases. It is greater on the two upper floors, the thickness of the outer walls there being less. In the case of the buildings originally planned the area was uniform as the outer walls were intended to be uniformly 14 inches thick on all floors.

8 DETAILS OF RENTS —The rent for each tenement is fixed at Rs 25 on the ground floor, Rs 30 on the first floor and Rs 33 on the second floor, plus rupees 3 in each case for contingent expenses of the Society, but it is exclusive of the electric charges for lights in the sole use of tenants. The total monthly income under both heads comes to Rs 194 from each building and the total annual income from all the 3 buildings is therefore Rs 6,984, say nearly Rs 7,000.

The average monthly rent per tenement including contingent charges is Rs 32 3, i.e., Rs 5 per 100 sq feet of the rented floor area. The rents are so fixed as to yield a net interest of 5 per cent per annum on capital after covering all outgoings. The income works out 9.7 per cent gross on the invested capital of Rs 72,000 or 7.4 on Rs 94,000 if the cost of land be included.



Grants for Sanitation in Bengal.

THE table below shows the amount of Imperial Grants (both recurring and non-recurring) received for expenditure on Sanitation in Bengal since the year 1911-12 and the total expenditure during the same period

	Unspent balance on 31st March 1911	Amount of 1911-12	Grants received in				Total
			1912-13	1913-14	1914-15	1915-16	
Non-recurring	Rs 13,30,000	Rs 7,25,000	Rs 20,00,000	Rs	Rs	Rs	Rs 40,55,000
Recurring			4,50,000	4,50,000	4,50,000	4,50,000	18,00,000
Do	.			5,00,000	5,00,000	5,00,000	15,00,000
Total of San Grants received since 1911							73,55,000

	Rs
Total San Grants	73,55,000
Expenditure in 1911-12	5,68,486
„ in 1912-13	5,42,228
„ in 1913-14	6,13,088
„ in 1914-15	5,11,026
„ in 1915-16	2,87,819
	<hr/> 25,22,647
Balance available	Rs 48,32,353

Educational Grants in the Central Provinces.

THE statement below shows the amount of Educational Grants made to District Funds and Municipal Funds since 1910-11

	Grants to District Funds	Grants to Municipal Funds	Portions of Grants made to District Funds that have lapsed by not having been drawn
1910-11	48,975	65,930	
1911-12	5,24,280	73,901	2,000
1912-13	6,28,446	1,02,433	640
1913-14	5,91,817	67,011	640
1914-15	8,29,252	191,238	4,113

In 1912-13, Rs 80,000 was made over to District Councils and Rs 20,000 to Municipalities from unspent balances of Government of India Grants for the construction of Primary School buildings

Public Health and Sanitation.

Method of Disinfection in the case of communicable diseases

BECAUSE of the high price of permanganate of potash used for disinfecting purposes and because there seems to be no prospect of its becoming less for some time to come, the Iowa State Board of Health has issued the following order as to disinfection

First, all clothing should be boiled and washed thoroughly which can be washed, and all other clothing should be properly aired and exposed to the sunlight

Second, all wood work and surfaces should be washed thoroughly with good soap and water, together with all furniture and utensils used about the sick.

Third, disinfection by the formaldehyde method may be performed as follows —

Formaldehyde disinfection by the sheet method

- 1 Prepare room for disinfection
- 2 Suspend an ordinary bed sheet (2 by $1\frac{1}{2}$ yards) by one edge from a line stretched across the middle of the room. The ordinary rather coarse cotton sheet should be used in order to secure rapid evaporation

3 Sprinkle 8 ounces of formaline—the 40 per cent solution of formaldehyde gas—on the sheet. This sprinkling may be done with a rose-head sprinkler such as is used by florists

The above quantity is sufficient for disinfecting 1,000 cubic feet of room space. If more space is to be disinfected, increase proportionately the number of sheets and amount of formaline

- 4 Keep room closed for at least eight hours

Fourth, it is quite necessary to follow all of the means of prevention, as proper care during a sickness is a real prevention

With the exercise of due care, the waste products which act as vehicles for the infectious agents of our common and occasional scourges may be so effectively dealt with from hour to hour and from day to day as to make the after-treatment of the room and its contents somewhat of a mere form, carried out as a matter of routine practice or in order to make assurance doubly sure

Stegomyia in Calcutta

FOR all practical purposes there are in India in regard to sanitation, but two species of *stegomyia* to be considered. These are *S. scutellaris* and *S. fasciata*. Both these species are common in Calcutta.

* Abstract of a report by Major Christophers, I.M.S.

S. scutellaris is almost universally prevalent in India from the Himalayas to Ceylon. It may breed under various conditions, but prefers such breeding places as holes in trees, water containing dead leaves or decaying vegetable matter. It therefore tends to be commonest under sylvan conditions. It is also common in towns but tends to be less prevalent where the concentration reaches a very high degree.

S. fasciata has a much more localised distribution in India. Like the former species it may breed under a variety of conditions but it prefers collection of clean water in domestic receptacles. It is rarely found leading an independent life in jungle and its capacity for living in collection of stored water enables it to exist even when the density of population is very high. It is, therefore, characteristically the town *stegomyia* of India. A peculiarity of the species is its power to flourish in connection with boats, ships and at the harbour side generally. Hence it is pre-eminently also a port mosquito.

S. fasciata is the known transmitting agent of Yellow Fever. There is no reason to suppose that if Yellow Fever were present in India this species would not disseminate it. Whether *S. scutellaris* can act as a carrier of Yellow Fever is as yet unknown.

New Orleans, a city of 325,000 inhabitants, of about the same latitude as Calcutta embarked, on account of Yellow Fever, on operations involving a medical staff of 50 and a general staff of 1,203. In Rio de Janeiro, a city of 800,000 inhabitants, chiefly on account of anti-stegomyia work necessitated by Yellow Fever, a staff of 1,500 is employed with an annual expenditure of the equivalent of eighteen lacs of rupees.

In the case of Calcutta, should Yellow Fever be established, not only might a permanent expenditure approaching this amount be necessary, but there is the even more serious question of a failure to stamp out the disease in Calcutta allowing of the introduction into India generally of a new and deadly disease.

Probably no condition in the tropics is more universally the cause of discomfort and inconvenience than the excessive prevalence of *stegomyia*. The ordinary *Culex* (*C. fatigans*) being nocturnal is comparatively innocuous in this respect. It is the prevalence of the

day-biting alert and wily *stegomyia* which determines for most people the extent of the mosquito curse. It is not necessary that one should have to prove the carriage of some specific disease before the removal of a particular condition is called for on sanitary grounds. Foul smells and many other conditions universally regarded as insanitary have in themselves often no direct proven disease producing power. But they are a nuisance and cannot be tolerated under conditions of life at which the sanitarian aims. The control of *stegomyia* in Calcutta is therefore, or should be, a part of any general scheme of sanitation and anti-stegomyia work must take its place in the public health operations of the City.

It must also not be forgotten that besides Yellow Fever *S fasciata* is a known carrier of *filaria*, with its gruesome consequences of elephantiasis, and is suspected to be one of the disseminators of certain little known fever.

Work already done with respect to stegomyia in Calcutta	Some action, and very pertinent action, has already been taken in respect to stegomyia in Calcutta
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(1) An enquiry has been made as to the prevalence of *S fasciata* in the different parts of India (Stegomyia Survey instituted by the Director-General, Indian Medical Service)

(2) The general mosquito fauna of Calcutta as occurring at different times of the year has been studied (Dr Parva working at the Indian Museum)

(3) A special survey has been undertaken to ascertain the distribution of *S fasciata* (and other stegomyias) in the port of Calcutta (Major MacGillchrist)

(4) Very valuable observation work upon the conditions as regards stegomyia in two typical selected areas in Calcutta have been carried on by Assistant Surgeon Nandi under the Health Officer

In addition to these local investigations, there is the comprehensive study of the whole question of *stegomyia* reduction and the Yellow Fever problem generally as it affects India, by Major James. As a result of a unique experience Major James has come to certain

conclusions regarding the practicability of *stegomyia* reduction in Indian seaports. These conclusions must be given very great weight and have greatly simplified my task as regards the recommendation of measures for Calcutta.

As a result of these enquiries the question of *stegomyia* reduction in Calcutta has been advanced from a vague and general idea to a definite and more or less exact conception of what is required. No actual reduction measures have, however, so far been attempted in Calcutta.

Conditions relative to <i>Stegomyia</i> in Calcutta	From the point of view of anti- <i>stegomyia</i> work, Calcutta may be roughly divided into (1) the Port and (2) the City
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The Port includes a narrow strip of land along the east bank of the Hooghly some seven miles long occupied mainly by jetties and warehouses, a strip of miscellaneous ground of somewhat similar extent on the west bank of the Hooghly and the Dock area at Kidderpore.

My examination of the jetties and warehouses showed that possible breeding places would mostly be of a nature to be readily controlled. Similarly, as regards *stegomyia* in the Dock area, there appeared no very special difficulties, the chief sources probably being pieces of wasteground used for dumping machinery, engineers' stores, etc. Conditions on the west bank are more difficult as there are considerable areas of insanitary bustee with much waste ground littered with rubbish and stores affording a great variety of breeding places. Also the various mills and works bordering upon the river here might be found a difficulty. One of the earliest problems in respect to the port, however, would be connected with the many thousands of lighters, country boats, launches, etc., in the harbour. Major MacGillchrist notes that *S. fasciata* is extremely frequent on these boats. My own experience has also shown that in association with water storage on small launches, boats, and harbour craft generally, there are produced very favourable conditions for *S. fasciata*, so that this species may be found on such craft even when by no means so common on shore. It is very possible that the real *stegomyia* problem of the port is this question of boat derived insects.

The City of Calcutta covers an area of 11,954 acres (18½ square miles). There are 25 wards with population varying from 3,000 to 63,000 persons under the care of the Municipality. The population of the whole city approaches a million. There is no reason to suppose that *S. fasciata* is not present everywhere where facilities for its breeding occur. Obviously the task of controlling, let alone exterminating, *S. fasciata* within the city limits would be an enormous one.

Very roughly three types of town may be differentiated in respect to stegomyia. These are —

- (1) Residential areas occupied by large isolated bungalows
- (2) Densely aggregated Eurasian and better class Indian quarters
- (3) Purely Indian quarters or the bustee type

Bungalow area — The work of Assistant Surgeon C. K. Nandi upon a selected area of this kind has shewn the chief breeding places of stegomyia to be as shown in the following tabular statement

Nature of breeding place	Number of examinations	Number of times that larvae were found
Anti-formicas	707	167
Pots, tins, etc	190	29
Cement cisterns	246	12
W. C. cisterns, etc	203	0
Drains	101	1

Cement cisterns and other miscellaneous collections of water in compounds have therefore to be considered, but the most numerous breeding places are those within the bungalows themselves, namely, anti-formicas. This is in accordance with my own previous experience that in the case of European bungalows stegomyia is chiefly derived from anti-formicas, the next most likely source being gumlas used for cooling sodawater. These sources are also those specially selected by *S. fasciata*. Cement cisterns, etc., are more frequently made use of by *S. scutellaris*.

Mixed Eurasian and Indian quarters—A typical area of this kind has also been kept under observation, the results obtained by Assistant Surgeon Nandi being as follows —

Nature of breeding place	Number of examinations	Number of times that larvæ were found
Anti-formicas	83	23
Cement cisterns	70	8
W C Cisterns, etc	248	0
Drains	53	0
Pots, tins, etc, about house or compound	395	101
Water storage pots in native houses	781	44

Here tins and vessels of various kinds in use or out of use about the house or in yards or compounds are the chief sources

Bustee quarters—Here one's first impression is apt to be that the conditions must be worse and more difficult to control even than in the previous type of area. But I am doubtful if this is so. It is usual for a small house in Calcutta to have at least one water pot, as a rule sunk in the ground, for storing water for domestic purposes. This practice is, however, by no means universal and was not found by me in all areas visited. Also in the ordinary household the pot more often than not seems to be kept effectively closed with a lid and to be free from larvæ. But in a certain proportion of these one finds *S. fasciata*. Especially in connection with shops one finds larvæ of *S. fasciata* in stored water in such pots which seem to form the chief kind of breeding place within houses in the bustee areas. Although no typical bustee areas have been so far kept under observation there are a number of small houses of this type among the larger dwellings in the second area investigated by Assistant Surgeon Nandi and it will be seen that out of 781 examinations of such collections of stored water larvæ were only found in 44. The exact nature and relative number of intra-domiciliary breeding places in different bustee areas will require to be carefully worked out before any broad generalisations can be made, but my general impression gained by visiting various bustee areas in Calcutta is that whilst *S. fasciata* is no doubt generally diffused on account of a certain number of intra-domiciliary

breeding places, there must be areas where this species is much in excess owing to the occurrence of great facilities in the way of extra-domiciliary breeding places

In the bustee areas there are, especially in some parts of the city, unbuilt over areas, these are usually covered with the debris of broken earthenware pots many of which are still capable of holding collections of water. There are also often other forms of likely breeding places for *stegomyia* in connection with these general dumping grounds for rubbish. In the rains these are likely to be much more important sources of *stegomyia* than breeding places inside the type of house surrounding them. Another common extra-domiciliary breeding place is to be found in the existence of very large water jars near latrines, and there are no doubt many other extra-domiciliary sources of importance, their nature depending a good deal upon the particular quarter of Calcutta examined.

In parts of the town where a large proportion of the dwellings are pucca houses with their rich complement of anti-formicas, tins and other receptacles, entry would probably be necessary for any appreciable effect to be made upon the prevalence of *stegomyia*, but the conditions in the bustee areas raise the question whether in many parts of the city a great improvement could not be brought about without house entry and merely by attacking conditions in certain pernicious waste areas, dumping grounds, insanitary yards and so on.

To attempt to deal straight off with *stegomyia* in the whole of Calcutta by means of a gigantic anti-*stegomyia* campaign would be most unwise. *Stegomyia* can never be permanently banished from Calcutta, except possibly by an extremely perfect sanitary system of which there is no immediate prospect. An enormous *stegomyia* gang would only be of use so long as it was actually in operation. For such time therefore as Yellow Fever remains absent from India (which may be a period of very many years) measures would not be employed which were suitable for and on a level as regards cost with those in a City where Yellow Fever was actually present. The actual circumstances do not demand this. The real requirements of Calcutta are as we have seen for an organisation of such a nature and size that it will be sufficient,

Action advised in regard to anti-*stegomyia* work in Calcutta

- (1) To yield experience of operations on a large scale,
- (2) To be capable of considerable expansion at short notice, if necessary,
- (3) To organise a routine of procedure in respect to *stegomyia* control that can be eventually taken over by the health authorities

Looking at the *stegomyia* problem in Calcutta from a broad point of view, there can be little doubt that the most urgent measure required is the control of the numbers of *S fasciata* in the Port area

The scale of operations required for the Port alone would be quite considerable. But in my opinion it would not be too large to be practicable and it would be large enough to give the necessary experience. The Port is the most critical part of Calcutta as regards the introduction of Yellow Fever. It is as a port that Calcutta has large obligations in respect to the possible spread of Yellow Fever and of a certain sanitary standard in general.

The port also offers comparatively favourable conditions for operation, for,

- (1) It is entirely accessible,
- (2) Minor regulations when decided upon as desirable could be enforced,
- (3) The conditions as regards *stegomyia* are less varied and should for the most part be more easily dealt with than in the City,
- (4) The Port has a relatively large revenue and should be able to afford more per unit of area than the City

The fact that the Port is first taken up in no way precludes the extension of operations later on to the City. I recommend, as will be seen later, such an extension by slow degrees as a steady line of policy.

If it is decided to take up anti-*stegomyia* work in the Port area, some form of organisation will be required and it is important that this should be of the right character. The organisation should not be a mere mosquito brigade under an Assistant Surgeon or other

subordinate It should be remembered that the duties of such an organisation will be gradually to build up and organise, not merely to act as a sanitary gang Later on a sanitary gang may be quite sufficient, when the exact necessary steps to control *stegomyia* as far as practicable under known conditions are made clear and obvious But until this result is attained the task allotted is a very difficult one demanding not only expert knowledge but much general experience

An officer of sufficient calibre will be necessary This officer will be doing work related to, but not confined to, research It would be necessary for him to work in consultation with the Port Officer But this officer cannot be expected to superintend or be responsible for what is in the nature of a continued special scientific enquiry For it must not be supposed that simply because the operations are "practical" that therefore they do not require the conduct of investigation Anti-mosquito work is too new a development to be successfully carried on as yet except hand in hand and following upon enquiry

As an example of the kind of work likely to be done we may take the case of *stegomyia* on harbour boats There are some 8,000 of these on the books of the Port authorities It would be a futile procedure for an officer engaged in anti-*stegomyia* work merely to try to control breeding in these by making his staff search out larvae and then destroying these when found He would do this at first merely so that he was able to grasp in full what the conditions were and how they could be met If stored drinking water were the chief source he would by experiment and trial devise ways by which water could be stored without breeding *stegomyia* If certain types of storage receptacle, were found especially bad and better types could be substituted he would endeavour to get some bye-laws or regulations put in force He would watch the operation of such regulations in action, the degree of non-compliance and reasons for this, the actual effectiveness or the reverse, and eventually when a good system of routine had been elaborated he should be able to hand this over to be carried out by the port authorities and apply himself to fresh problems

It is thus possible that a very large staff will not be required at least at first It would probably be advisable to leave the question of actual staff very largely to the officer chosen to carry on the work

There is not only the question of the Port as at present constituted. A large dock extension is in process of construction. So far as I could ascertain no particular steps are being taken to ensure the future freedom of this area from liability to become a highly insanitary one. Labour is housed in the neighbourhood under apparently little or no sanitary control. Bustee is certain, unless steps are taken to prevent this, to spring up in time and the grossly insanitary conditions seen at Kidderpore to be still further extended. Stegomyia control is only one of many sanitary precautions desirable, but where there is a chance of this being instituted from the beginning it would be a mistake to neglect the opportunity. But nothing can be done where there is no proper general sanitary authority. On the present dock site there is one temporary village (if one can call it so) so grossly insanitary that it would be difficult to find a worse example in India. Dirty squalid hovels are crowded together on ground full of pits breeding swarms of culex and littered with tins, broken pots and other receptacles suitable for stegomyia. To almost every hut there is a shallow cutcha well surrounded by mud and absolutely unprotected. There are faeces everywhere although on the edge of a swamp, the spleen rate is low (about 2 per cent) so that at present malaria would seem for some reason not to be prevalent. But such a collection of lines is a danger in many respects and its presence at all would seem to indicate the need of increased attention to general sanitation in the Port area as well as the more specific anti-stegomyia operations.

The Port offers a problem of comparative simplicity. The measures to be advised in regard to the City are much less obvious and far more difficult. I am inclined to think that considering the magnitude of the task and the absence of extreme urgency the question of anti-stegomyia work should be set about very deliberately and that operations on any scale should be postponed until the organisation employed on the Port area is free to commence systematic work in the City.

But though the question of *stegomyia* reduction in the City might not be taken up systematically until after experience had been gained upon the Port area there, there are many ways in which some action might be taken of a less ambitious kind pending this. Such action would fall within the province of the Health Officer.

(1) A continuance of work such as has already given good results in two observation areas

(2) Sanitary reclamation of especially bad waste plots

(3) The informing of householders in certain areas that an inspector will be sent if they wish for this to keep down mosquitoes on their premises. Comparatively few would probably ask for such visits, but if there was any demand at all it would serve to familiarise people with anti-mosquito atmosphere and to train men as inspectors and other minor measures that from time to time suggested themselves

When the full anti-stegomyia organization was available, operations in the City would be started in a thoroughly systematic way. As in the case of the Port the whole object would be permanent organisation. Probably particular areas would be taken in hand in order and after a time when the particular steps necessary for as complete a control as was thought advisable in each is made clear any anti-stegomyia work would be taken over by the Health authorities. It is not necessary that the whole of the operations relating to any one area should be handed over at once. The organising of measures for the city would be a slow process but in time even if it took a decade there would result a thoroughly routine procedure which would accomplish all that it was found by trial and experience could be accomplished.

It may be found that certain major sanitary improvements are more or less essential to any progress, *e.g.*, the very important matter of an improved water supply. It has been very clearly demonstrated that the character of the water supply has a great deal to do with the facilities offered to *S. fasciata* for breeding. An intermittent supply leads to water storage. Want of sufficiently numerous distributing taps may lead to the same result. Both of these conditions may be found to be in need of improvement or rectification in Calcutta before any very satisfactory anti-stegomyia results are obtainable. Such questions, however, are scarcely at present relevant to our object for such large questions would be amongst those to be decided only as a result of experimental operations of the nature I have advocated.

I am of opinion that any organisation of the kind outlined above should be continued for at least five years and that the posi-

tion of the officer at the head of it should be such that there is some likelihood of his being able to get such steps as he may decide upon carried through

(Health Officer's Note on the above report)

I have discussed Major Christophers' interesting and valuable 'Memorandum of measures that seem advisable with respect to stegomyia in Calcutta' with the Sanitary Commissioner, Bengal. We are in entire agreement with him as to the port being the most critical part of Calcutta as regards the introduction of yellow fever and strongly support his recommendation that an anti-stegomyia campaign under a special officer of sufficient calibre, should be commenced in the port before any operations on a large scale are started in the City. If this recommendation is accepted by Government, the City will then have the enormous advantage of being able to select the organisation and methods of procedure which have been proved to be the best by actual experience. At the same time, however, there seems no reason why the Corporation should wait for a complete scheme to be elaborated. I would suggest that the present staff of temporary mosquito-brigades be made permanent and placed under a trained Sub-Assistant Surgeon. This establishment would form the nucleus of a permanent branch of the Health Department. With an organisation of this description actually at work it would be a comparatively simple matter to gradually introduce the methods of procedure adopted by the Special Officer in charge of the port.

The present temporary staff of mosquito brigades consists of 16 Sub-Inspectors on Rs. 20 and 48 coolies on Rs. 8. They usually work for about 6 months. Formerly they worked under an Inspector (Sub-Assistant Surgeon) on Rs. 40, but last year they were placed under the Medical Inspectors instead. This worked fairly well, at first, but as soon as epidemic small-pox broke out, the Medical Inspectors were unable to supervise the work properly. A really trained man of Mr. Nandi's standing, would probably cost Rs. 200 per month.

An Enemy of the Mosquito

THE conquest of the mosquito in tropical climes constitutes the essential preliminary to the settlement and development of a new district—that is, if the claims of health are to be respected. But the elimination of the malaria-disseminating insect is apt to prove expensive, especially if the country is at all marshy. Spraying the pools and lagoons with oil has proved efficacious, but draining is generally held to be the only reliable solution of the problem. Recently, however, an investigator who has been studying the problem and who has carried out a number of experiments, has drawn attention to the fact that Nature herself offers the most effective remedy in the shape of the wild duck. In order to test his theory, he resided for some time in a mosquito-infected district where the marshland was extremely favourable to the propagation of the pests. Two ponds of equal dimensions were formed. Fish were placed in one, while ducks were encouraged to make their home upon the other. Within a short time this observer found that the pool frequented by the ducks was completely cleared of larvæ and pupæ, but the pond inhabited by the fish was thickly infested by them. Continuing his observations, he ascertained that wherever wild ducks abound, mosquitoes are scarcely to be seen, and that these thrive well upon the insects, preferring them, indeed, to any other food. As a result of these observations, he advocates that ducks should be introduced into areas which are now untenable owing to mosquitoes, as he believes that the birds will cope with the disease spreading insects far more effectively than any other precautionary measures will do. If this is done, draining may be postponed until a more convenient season.—*Cham Jour*

Municipal Rules, By-laws and Regulations.

THE STABLE AND SURROUNDINGS—The surroundings to the stable must be kept in sanitary condition. Cows must not be allowed to stand in manure or filth. The cow stable should be painted or whitewashed at least once a year. It must be kept free from dirt, dust, cobwebs, and

odour. Manure and urine must be removed from the stable at least once daily, and if not taken to field daily must be removed at least 30 feet from stable and placed where the cows cannot get into it. If horses are kept in same stable, a tight partition should separate them from the cattle. No other animals or fowls will be allowed in the cow stable. Floors must be laid not less than one foot higher than outside surface level so that good drainage can be procured. Floors must be constructed of asphalt, concrete, brick with surface flushed with cement or of wood, watertight. They must be kept in good repair at all times, and also constructed with a gutter not less than 12 inches wide and 6 inches deep, a 4-foot walk back of cows and not less than a 20-inch manger in front. Ceilings must be dust-tight and kept free from cobwebs.

NIGHT SOIL AS MANURE (DEHRA MUNICIPALITY)—Night Soil, horse litter, cow and buffalo dung and decomposed or decomposing vegetable matter (grass sodden with animal excreta and urine) shall not be used as manure on any land within the limits of the municipality, unless it has been buried and deodorised in shallow trenches or pits for six months in the case of night soil and for at least one and a half months in the case of other manures.

MOTOR VEHICLE—HEADLIGHT—In the Bangalore City Municipal limits no motor vehicle shall carry acetylene or electric headlight liable to produce intense glare and confuse traffic passing on the road, unless such a light is provided with a cowl or hood of suitable dimensions to be approved by the Registering Officer.

The Street Traffic Committee of the Safety First Federation of America have compiled a standard code of traffic regulations. The following regulation relates to the removal of headlight glare —

Wherever there is not sufficient light within the limits of the highway location clearly to reveal all persons, vehicles or substantial objects within said limit for a distance of at least 150 feet, the headlights of all motor vehicles in motion shall give sufficient light

to reveal any person, vehicle, or substantial object on the road straight ahead of such motor vehicle for a distance of at least 150 feet. The headlights shall be so arranged that no portion of the beam of reflected light, when measured 75 feet or more ahead of the lamps, shall rise above 42 inches from the level surface on which the vehicle stands. Such headlights shall also give sufficient side illumination to indicate any person, vehicle or substantial object 10 feet to the side of the said motor vehicle at a point 10 feet ahead of the lamps. The term "beam of reflected light" as used in the above provision shall be construed as meaning the approximately parallel focalized rays gathered and projected by a reflector, lens or other device.

TIME LIMIT FOR SPEECHES — (BOMBAY CORPORATION) —
The following resolution has been passed by the Bombay Corporation at a recent meeting:

No speech on the part of the mover of a motion shall exceed 30 minutes in length and no speech by any other Councillor or by the mover when replying at the termination of a debate shall exceed 15 minutes in length, provided always that this time limit shall only be operative when a member has drawn the attention of the President to this Rule. On the President's attention being drawn to the time limit, he shall at once rise and take the vote of the Corporation as to whether the speaker shall be given a further period of 15 minutes or not. If the vote of two-thirds of the members present is in the negative, the speaker shall bring his remarks to a close within such few sentences as the President may at his discretion allow, but shall not otherwise continue to address the House. If the vote is in favour of the speaker continuing, he may address the House for a further period of 15 minutes when the same procedure may be repeated according to whether or not the President's attention is drawn to the time limit.

The speech of a mover of an amendment does not rank for a time limit of 30 minutes as in the case of the mover of a motion, but only for a time limit of 15 minutes as in the case of any other councillor.

Road Making and Maintenance.

Road Tarring *

[By W H GLADWELL, COUNTY SURVEYOR OF NORFOLK]

THERE can be no doubt that the application of a standardised, distilled and dehydrated coal tar to road surfaces tends to preserve the road by protecting it against adverse climatic conditions, this has the effect of prolonging the life of the road, and thus tends to ultimate economy in the use of materials, and the cost of labour necessary to apply such materials. At the time when road tarring was in its experimental stage the necessity for using a distilled or specially prepared tar was not fully appreciated, and many failures resulted owing to the presence in the tar of certain volatile by-products, such as naphthalene, phenol, etc., but it is now possible to obtain an article in every way satisfactory, and many firms are marketing a tar prepared in accordance with the specification issued by the Road Board. It is however the opinion of many expert road engineers that it is more economical in the long run to incorporate the tar compound in the structure of the road in the form of tar-macadam, than to apply successively a coating of tar to the surface of the road, inasmuch as all tar, however carefully prepared, is subject to oxidation by atmospheric agency, but as it would be impossible owing to the cost, to renew all roads with a coating of tar-macadam, surface treatment may be regarded as a satisfactory alternative method of adding to the wearing qualities of a road surface.

Failures

Where failures have resulted in the application of tar to road surfaces they may be said to be attributable to one or more of the following causes (1) The use of crude tar, which, at best, is of varying quality, even when procured from the same works, (2) the improper application of tar, i.e., in damp or wet weather, (3) failure to bring up the road surface to a

* Report presented to the Council

proper contour. It is next to useless to tar a weak or irregular road surface, (4) when a road is shaded by buildings or trees it often happens that failure results, (5) a road which by reason of its surroundings is, or becomes, water-logged should not be tarred until these defects have been remedied, (6) the use of improper binding materials is to be deprecated. The best material is granite chippings, or clean gravel shingle, these latter have in many instances been used with good results. All binding material should be clean and free from loam. It should be noticed that where, by reason of the presence of buildings or trees, a tarred road fails to come up to expectation on account of its becoming muddy in wet or wintry weather, the same road, if left untarred, would be still more muddy under similar climatic conditions.

As attention has been called by the Government to the imperative necessity of the exercise of economy in every department of public administration, and the desirability of considering how far such economy can or may be effected without permanent detriment to public interests, I beg to recommend that only such work of road tarring be undertaken as may be necessary to keep the existing tarred roads up to a reasonably satisfactory standard. It would appear to be undesirable that such work of this description as has been already undertaken should be permitted to deteriorate from lack of proper and sufficient resuscitation. One hundred and fourteen miles of roads and 78 miles of paths were in last season's estimate for tar treatment, at a cost of £ 6,392, necessitating the use of 258,219 gallons of tar 25 per cent only of which was crude.

Life of tarred roads

I beg to bring before your notice the following particulars and suggestions. A mile of road costs to coat £600, the life of same if not tarred does not exceed six years, two applications of metalling in twelve years, £1,200, cost of upkeep, patching, scraping, sweeping and silting (the latter to prevent disintegration of road surface), £360, total cost in twelve years,

£1,560 A mile of road costs to coat £600, tar treatment for a period of twelve years, £400—£1,000 Saving effected, £560

The foregoing is not by any means an exaggerated estimate of the life of a tared road, as there are many sections of road in this country which will last a considerably longer period.

The tarring of paths, with very few exceptions, might be dispensed with for one year without the surface suffering to any appreciable extent, an outlay under this head would, therefore, be avoided of £700, and I consider that it is highly probable that the treatment of half the mileage of roads might at any rate be deferred for next season without any serious damage accruing thereto, this would amount to £2,800, leaving £2,900 to be expended in place of the estimated cost of £6,392 It should be borne in mind that if the tar treatment of roads is abandoned in its entirety, it will be necessary in some cases (to obviate the disintegration of road surfaces) to apply silt, which would entail a considerable outlay The nuisance and annoyance caused by this method, owing to the consequent raising of dust by motor and other traffic, you are, I feel sure, fully conversant with to say nothing as to the objection of this process on hygienic grounds

The Suction Type of Motor Street-Sweeper

Motor street-sweepers, for which it is contended that they save both time and money, are now made in three types, the pneumatic, or suction type, the flushing type and the revolving-broom type with pick-up attachment Some aspects of the operation of the suction type are discussed by a writer in *The Commercial Vehicle*

" Picking up its own load by suction, the sanitary motor driven vacuum street-sweeper is self-contained and differs from the conventional type in that the revolving cylindrical sweeping-brush is eliminated In its place is used a series of small, straight-sided brushes which sweep the street in front of a row of air-nozzles that

suck up the dirt into a wind-chest. From there it is forced by means of exhaust blowers into a steel refuse-receptacle carried on the truck frame.

"The motor-truck engine is placed partly under a conventional hood forward of the dash and partly under the floor of the driver's cab. The wind chest is placed below the frame directly aft of the driver's seat and the exhaust-blowers directly above on top of the frame. The steel body extends forward to the rear of the driver's seat, but is undercut at the bottom to make room for the exhaust-blowers.

"The wind-chest is made of sheet steel in the shape of a box with converging sides, the bottom being wider than the top. The ends of the chest flare outward and extend several inches beyond the wheels of the vehicle on both sides. The lower edges of the chest are flanged and carry at the front a shaft to which are attached the sweeping-brushes, and at the rear a transverse pipe on which the air-nozzles are supported. The nozzles are hinged to this distributor pipe, so that they may move up and down in riding over obstructions.

"Each nozzle is a unit by itself and extends downward and backward toward the rear of the truck for a distance of several inches at which point it is bent downward in a vertical position. This vertical portion of the nozzle is split into two parts like an inverted Y on the rear sides of which are placed small bearings that carry a rubber-tired wire wheel. This wheel extends part way through the Y and keeps the lower ends always the correct height above the ground. The bottoms of the Y do not extend down to the ground, but are provided with short pieces of leather which touch the surface of the street.

"Each nozzle is supported in a circular band attached to a rod which is bolted to an arm fixed on the shaft on the rear of the wind-chest. The rod is inserted within a spiral spring which is under tension thereby always keeping the wheels supporting the nozzles in contact with the ground.

"The shaft on the rear of the wind-chest which carries the arms supporting the nozzles is revolved by means of a lever in the driver's cab by which he may raise all the nozzles clear of the ground.

" The shaft at the forward edge of the wind-chest carries a series of arms to each of which is connected a small straight-sided brush held in contact with the street surface directly in front of two of the nozzles by means of spiral springs under tension in the same manner as are the nozzles

" This shaft is driven by a chain from the jackshaft, the arms carrying the brushes being mounted on circular sleeves working in slotted cams on the driven shaft. In operation the cams revolve with the shaft and cause the brushes to oscillate back and forth in front of the air-nozzles sweeping the dirt out of the crevices of the street surfaces so that it may be picked up easily by the suction of the nozzles

The speed of oscillation and the pressure exerted by the springs on the brushes are regulated by the operation of two separate levers according to the condition of repair of the pavement, the kind of surface being cleaned, and the speed of the truck. The brush may also be lifted clear of the street in the same manner as are the nozzles when passing over the streets which are not to be cleaned

" The wind-chest is extended above the truck-frame on each side to enclose the two exhaust-blowers which are mounted on the same transverse shaft. This shaft is driven by a chain from the lay-shaft of the gear-set. Its speed is controlled by a set of levers in the driver's cab

" The wind-chests are connected with the outsides of the casings surrounding the exhaust-blowers at the centre, the dirt laden air being expelled from the fans at the top peripheries into the steel refuse-receptacle through two short neck like portions of the fan casings. These parts of the casings are rectangular in section and are provided with gaskets at the points where they are connected with the steel body. They are not bolted to the body, however, because the latter is of the dumping type, and when elevated the apertures through which the air enters are higher than the fixed exhaust-outlets of the fans

" The refuse receptacle or truck body is made entirely of steel and is closed at the top except for several small openings covered with cloth to catch the dust in the air as it passes out into the atmosphere. The body is elevated for dumping by means of a screw hoist operated from the truck motor

"In operation, the vehicle is run at a certain speed, according to the condition of road and the kind of pavement being cleaned, the speed of the brush system and the exhaust-blowers being regulated by levers in the driver's cab according to the same conditions. The oscillating brushes sweep the street surface directly in front of the nozzles and the suction of these caused by the exhaust-blowers sucks up the refuse-laden air into the fan, from which it is expelled in the large receptacle"

Government Orders and Notifications.

[Mysore]

Vehicle Tax in Municipalities

The levy of taxes on vehicles including motor vehicles and springed carriages is made in the Regulation Municipalities at the discretion of the Municipal Councils concerned in accordance with the procedure prescribed in the Municipal Regulation and it is not therefore necessary to pass any order on this point

2 As regards non regulation Municipalities, the replies from the Deputy Commissioners show that in some of them motor vehicles and springed carriages are taxed under Monataria Rules, while in others they are not so taxed. This divergence of practice is due perhaps to the non observance of the marginally noted Government orders directing that the use of the vehicle for carrying loads and not its constructive arrangement should be the criterion for taxing it.

3. On a careful reconsideration of the question, Government think that the exemption in the case of vehicles not used for carrying loads is no longer necessary and they are accordingly pleased to direct that in all non-regulation Municipalities carts of all descriptions including springed carriages, ordinary bicycles and tricycles and motor vehicles be charged with mohataria cart tax in future. On each ordinary bicycle or tricycle or single bullock cart the rate of tax shall be one rupee per annum and on other kinds of vehicles, Rs 2 per vehicle a year shall be collected

4 This order does not affect the exemptions granted in favour of—

(a) Hali Bandies in the Municipalities of the Chitaldrug District used solely for conveying produce from fields under Government Order No 2945-59, dated 14th June 1890.

(b) Carts used in Municipalities for carrying water for domestic purposes and not for sale under Government Order No 18217-26—L, F 252-99 of 10th February 1894, and

(c) Other carts, if any, under special orders of Government Order No 5387-96 -MI 61-14 65, dated 26th January 1916

[Madras]

Sanitary Inspectors.

In issuing orders in G O 1568 M, dated 29th September 1915, on the subject of the employment of health officers in certain municipalities, the Government ordered the discontinuance of the use of the title of chief sanitary inspector in the towns affected and left it to the councils concerned to decide whether, in any reduction of the sanitary staff which might follow on the employment of the health officers, the chief sanitary inspector or any other member of the staff should be dispensed with

2 Representations have been received that these orders involve hardship, not only on the chief sanitary inspectors, who are made liable to be thrown out of employment, but also on the whole staff of sanitary inspectors and assistant sanitary inspectors, whose prospects of promotion are liable to be reduced if a reduction is made in the number of appointments in the highest grade

3 The Government have carefully examined the question and are of opinion that these representations are in some measure justified. They are therefore pleased, in partial modification of the Government Order above quoted, to advise municipal councils that, in cases in which a council is of opinion that a reduction in the sanitary staff is necessary, it should be effected by dispensing with one of the sanitary inspectors in the last grade. The councils will also be requested to bear in mind that the question of the adequacy of the number of sanitary inspectors should be decided irrespective of the consideration that a health officer is to be appointed, as the health officer is not meant to take the place of a sanitary inspector, but is to be the highly-trained administrative head of the health department of the municipality [G O No 648 M, dated 1-4-16]

Legislative Intelligence.

[Bombay]

THE Hon'ble Mr. J. P. Oll asked whether Government have taken or propose to take any special steps to secure that there shall be adequate building by-laws in force in the several mofussil municipalities in the near future. Government replied —

“With Government Resolution No. 739, dated the 28th January 1914, copies of a note by the Honourable Mr. Oll, entitled “How to check the growth of insanitary conditions in Bombay City,” were forwarded to all Commissioners and Collectors. The Collectors were requested to communicate copies to the municipalities in their districts and, in the case of the larger municipalities, to ask them to consider the question of incorporating in their rules the principles of the 68³/₁₀ air plane and light plane rules as set forth in paragraph 6 of the note. The Commissioners were asked to report at the end of a year the action taken by the municipalities in this matter. Only two reports have been received and these are very incomplete. Further information on the subject, and copies of the rules actually in force, are being called for. When these are received Government will consider what further action is necessary to secure the existence of adequate building by-laws in mofussil municipalities.”

[Bengal]

The Hon'ble Raja Mahendra Ranjan Ray Chaudhuri asked whether the Government have formulated any definite line of action in order to reduce the high rate of infant mortality in the Presidency?

The following answer was laid on the table —

“The causes responsible for the high proportion of infantile mortality are so inextricably bound up with the domestic life and social customs of the people that they cannot be eradicated by any special action of Government. It is from provision by local authorities of trained midwives and

lady doctors, and their influence among country *dhars*, and from the education of women in the essentials of domestic hygiene through the instruction of girls at school, and the general diffusion of sanitary knowledge, that Government believe most will be effected in mitigation of the evil. The measures taken for the reduction of malaria and for the improvement of water-supply will also have their effect in reducing the large amount of infantile mortality which is due to fever and bowel diseases. Improvement is primarily to be looked for in municipalities, but the increased attention paid to accuracy in the registration of births and deaths is likely to obscure a decrease in the proportion of infantile mortality for some time after it has set in."

[Central Provinces]

The Hon'ble Rao Bahadur N. K. Kelkar asked what action the Government intended to take with reference to the remarks in the last quinquennial Educational Report for the Central Provinces, contained in paragraph 6, p. 10, entitled "External means of Education", and whether the Government proposed to start village libraries as advocated in the said Report?

Government replied as follows —

(a) As regards the first part of the question the following steps have been taken —

(i) Libraries are attached to most village schools under public management. Such libraries are not reserved exclusively for school purposes but are available for use by the villagers. They are financed from school fees and any grants which Local Bodies may make.

(ii) Two monthly Magazines published in these Provinces, one in Hindi and one in Marathi, are distributed among most of these libraries. For Urdu School Libraries, an Urdu monthly Magazine has been sanctioned.

(iii) Lists of suitable books in Hindi, Marathi and Urdu have been drawn up from which the school libraries can make selections.

(iv) In 1907 a scheme for the formation of village libraries was formulated in the Balaghat District by the then Deputy Commissioner, Mr. Low, and a village library committee was established for the encouragement of these libraries. This scheme was reported to the Local Administration and it was recommended that the experiment should be tried in other districts. The question was considered at a Conference of Commissioners held at Pachmarhi in June 1907, and it was decided that there was no objection to District Councils making grants to village libraries and paying a small allowance to the schoolmasters for performing the duties of librarian. In 1912 sanction was given by the Administration to a contribution of Rs. 400 per annum being paid by the Balaghat District Council to the village library committee. The Administration has no information regarding the scheme having been extended to any other districts in the Province.

(b) Apart from the action described in the answer to the first part of the question Government has no present intention of taking further steps for the formation of village libraries as distinct from the school libraries which are intended to serve the purpose of the villagers as well as of the schools.

The Hon'ble Rai Sahib Seth Nathmal asked whether Government will have a special inquiry made as to the causes of the heavy infant mortality in the Province and as to the measures that should be taken to remove those causes?

Government replied as follows —

The subject of infant mortality is dealt with in considerable detail in the published annual reports of the Sanitary Department and in the Resolutions of the Local Administration upon them. If the Hon'ble Member will refer to these published reports he will see that much has been done of late years towards dealing with this grave problem, both directly by the officers of the Administration and also by local bodies, by the Dufferin Fund and through private agencies. The

matter is one that is constantly under the consideration of Government. Local enquiries are made by the Sanitary Commissioner in each district or town in which infant mortality is observed to be unusually heavy, and the various factors which contribute to the great mortality among infants are not unknown. Under these circumstances Government does not consider that any special enquiry on the general subject is necessary.

The Hon'ble Rai Sahib Mathura Prasad asked whether the Government would consider the introduction of the system of payment of travelling allowances to members of District Council and Local Boards with a view to facilitate and improve the attendance of members at the meetings of the District Councils and Local Boards ?

Government replied as follows —

The proposal for the payment of travelling allowance to members of District Councils and Local Boards does not appear ever to have been suggested or considered in these Provinces. The proposal would involve a considerable strain on the finances of some of the smaller district funds, and there appear to be other practical objections to it.

The Hon'ble Mr. M. R. Dixit asked whether there was any objection to the District Boards concerned taking up the construction and working of either of the feeder Railway Lines between Dhamangaon and Zeotmeal ?

Government replied that they were not prepared to make any arrangements with regard to the construction of the line being taken up by the District Boards, further than that, the subject could not in any case be considered at the present time. The District Boards could better employ their surplus funds in meeting other objects of public utility.

[Punjab]

The Hon'ble Rajzada Bhagat Ram asked how many panchayats were established under the Punjab Panchayat Act, 6 of 1912, how many cases were heard by them in each district and whether the working of the Act was satisfactory ?

Government replied as follows —

“Thirty-one panchayats have been established in 10 districts under Act 6 of 1912. A statement of the number of cases heard in each district is laid on the table. The figures show that except in Karnal, Gindaspur and Lyallpur the panchayats are but little resorted to. In several districts, including that in which the Hon'ble Member resides, it is reported that there is a good deal of opposition to these tribunals on the part of pleaders and petition-writers. Certain suggestions for the improvement of the Act are now under the consideration of Government, but as the Act has only been in actual operation for a little more than a year it is unlikely that any changes will be made till further experience has been gained.”

As resort to the panchayats is entirely voluntary, the success of these tribunals must depend upon the attitude adopted by the people and on the efforts made by the officials and others to whom they look for advice and guidance to explain the advantages of the system. There is some reason for believing that pre-occupation with more pressing duties since the outbreak of the war has been responsible for the small results hitherto attained.”

The Hon'ble Rai Bhadur Ram Saran Das asked —

“What was the total number of municipalities in the Punjab in 1901 and what is the number now? What was the number of notified area committees in 1901 and what is it now? Will the Government be pleased to enlighten this Council with the circumstances which led to an increase in the number of notified area committees? How many municipalities were converted into notified area committees during the same period and for what principal reasons common to each case?”

Government replied as follows —

“In 1901 there were, inclusive of Delhi, 137 municipalities and 46 notified areas in the Province. The respective figures at the present time are 100 and 98.”

" Since 1901, 32 new notified areas, mainly market towns in the colonies, have been constituted, while 14, including two transferred to the Delhi Province, have been removed from the list

" During the period in question 34 municipalities have been converted into notified areas. These were mostly towns of small size and importance to the conditions of which the elaborate administrative machinery of a municipality was hardly suited. In the few remaining cases alteration was due to persistent inefficiency or the violence of faction feeling "

The Hon'ble Rai Bahadur Bakhshi Sohan Lal asked — With reference to the educational expenditure of the District Boards, whether the Government were aware that in comparison with other major provinces in India, the percentage of income from fees in Board Schools to the total revenue of District Boards was the largest, and whether in view of that fact, the Government would direct that the Boards might expend up to 33 per cent of their total receipts ?

Government replied —

" Government is aware of the fact mentioned in the first part of the question put by the Hon'ble Member. A minimum standard of expenditure on education by District Boards was formerly fixed but was abolished in 1908 as it was found impossible in practice to insist on full compliance with directions which from their very nature could make no allowance for the varying conditions of different districts. Government is therefore not disposed to revive a system which has proved unworkable in the past and which would involve an interference with the discretion of District Boards entirely at variance with the policy of Government. As a matter of fact the present percentage of expenditure by district boards in the Punjab on education compares most favourably with the figures of most other provinces in India "

Some Recent Publications.

THE HOUSING OF THE WORKING CLASSES ACTS, 1890-1909, AND THE HOUSING ACTS, 1914 By C E Allan and F J Allan, M D (Fourth Edition) Butterworth 12s 6d net

THE WELSH HOUSING YEAR BOOK South Wales Garden Cities and Town Planning Association Price 1s net

CONSTRUCTION, EQUIPMENT AND MANAGEMENT OF A GENERAL HOSPITAL By D J Mackintosh, M V O, Medical Superintendent of the Western Infirmary, Glasgow (Second Edition)

TROPICAL HYGIENE By the Hon'ble Sir Paidey Lukis, K C S I, and Lt Colonel R J Blackall, C I E (Third Edition) Thacker Spink & Co Price Rs 3

WOMAN'S WORK IN MUNICIPALITIES By Mary Ritter Beard (Nat Municipal League Series) Appleton 6s net

AMERICAN MUNICIPAL PROGRESS By C Tueblin The Macmillan Company 8s 6d net

THE CITY OF DIN A trade against noise By Dan McKenzie, M D, Adlard 3s 6d net

PRINCIPLES AND PRACTICE OF MUNICIPAL GOVERNMENT By the Hon'ble Mr T M Nair, M. D., Higginbothams Ltd

PLAGUE PROOF TOWN PLANNING By J H Stephens, Methodist Publishing House Price Re 1

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Reddy (C R) The most Modern Experiment in City Government (Mysore Economic Journal, March 1916)

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ROADS

Adshead (S D) The lay-out of roads in relation to requirements (Town Planning Review, January 1916)

SURVEYING

Lance Martin (H E) Photographic Surveying in Town Planning (Town Planning Review, January 1916)

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Lawrence (H S) Municipal Taxation Dnyan Prakash Press, Poona

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Notes.

THE LONDON COUNTY COUNCIL — Sir H Lushington Stephen was elected an Alderman in the place of Lord Chelmsford

FIROZABAD WATER SUPPLY — The Sanitary Board (United Provinces) have recommended the installation of a tube-well with a tank, (which it has been ascertained will probably cost Rs 25,000), half the cost being provided by Government

MUTTRA — The final sanction of Government has been accorded to the revised estimate, amounting to Rs 4,83,724 for the water supply scheme at Muttra

SANITARY BOARD (UNITED PROVINCES) — In consequence of the abolition of the Provincial Malaria Committee and the

transference of its duties to the Sanitary Board, the Inspector-General of Civil Hospitals has been appointed a member of the Sanitary Board

HEALTH OFFICERS FOR MUNICIPALITIES (MADRAS)—The original scheme for the appointment of Health Officers for Municipalities provided for the employment of 12 officers of the first grade. Owing, however, to a reduction of the anticipated assignment from Imperial revenues towards the cost of the scheme, only a first instalment of it can at present be introduced. This has involved the employment of only two Health Officers of the first class who are allotted to Madura and Trichinopoly.

THE BOMBAY CORPORATION—Mr. Chunilal v. Mehta was unanimously elected President of the Corporation for the year 1916-17. Mr. Mehta is a prominent member of the commercial community and entered the Corporation in 1907. Mr. Salebhoj Currimji Barodawalla was elected Chairman of the Standing Committee.

TERMINAL TAX IN HARDA—With effect from the 10th April 1916, the imposition of a terminal tax by the Municipal Committee of Harda, in the Hoshangabad District has been sanctioned. The following rules have been framed for the assessment of the new tax.

1. On all goods imported or exported by rail, a "Terminal Tax" shall be levied at the rate given below—

- | | |
|--|--|
| (i) At six annas per maund on each occasion | Cloth |
| (ii) At three annas per maund on each occasion | Sugar |
| (iii) At two annas per maund on each occasion | Ghee, leather, cotton and <i>ru</i> , dried fruits, cocoanuts, brass and copper and their articles |
| (iv) At one anna six pies per maund on each occasion | <i>Gur</i> |

- (v) At one anna per maund on each occasion Tobacco, hides, metals, *i e*, iron, wire, zinc, etc, and all their articles except copper and brass
- (vi) At six pies per maund on each occasion Oil-seeds and oils (other than kerosene)
- (vii) At three pies per maund on each occasion All other goods and articles not mentioned in Nos (i) to (vi) above

2 The following articles will be exempted from taxation —

- (a) All articles, the property of Government, imported or exported on behalf of Government
- (b) All separate consignments less than 15 seers in weight, whether imported or exported
- (c) All parcels imported or despatched through Post Office
- (d) All personal luggage of railway passengers coming to or going out of the town
- (e) Cotton and ~~raw~~ on import

LOCAL SELF-GOVERNMENT —The Report of the Committee appointed on the Resolution of the Hon'ble Mr. Patel to consider and report on the development of Local Self-Government as applied to local boards is still under consideration of the Government

THE PILGRIMS COMMITTEE —The Indian Pilgrims Committees have submitted their reports on the arrangements for pilgrims in connection with pilgrimages held in the United Provinces, Bihar and Orissa, Madras and Bombay, and the reports have been referred to the Local Governments concerned. On receipt of the Provincial Reports, the Sanitary Commissioner with the Government of India will prepare a general report which will, it is hoped, shortly be submitted

LOCAL AND MUNICIPAL LEGISLATION —It is understood that the drafts of the Central Provinces Municipal and Local Self-Government Bills have not yet been completed or fully

considered by the Local Administration. When they are ready, the Chief Commissioner will lay them before a small committee for the purpose of making suggestions as to the principles involved in the legislation.

CENTRAL AVENUE SCHEME.—It is notified that the first section of the street scheme known as Central Avenue Scheme submitted by the Calcutta Improvement Trust to the Government has been sanctioned. The net cost of the scheme is estimated at Rs. 20,34,023.



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MAY

[1916

Co-operative Societies and Rural Sanitation.

IN our last issue we referred to the good work done by certain co operative societies in this Province in the matter of executing the rural sanitary works entrusted to them by the Local Government as an experimental measure. In the matter of the expenditure of these sums, Government dispensed with the usual formalities required by the Local Fund Code and other Standing Orders and directed that the President of the Taluk Board concerned should inspect each work as it was completed and report to Government through the Registrar of Co-operative Societies whether the money had been properly spent and how far it had been supplemented by local contributions. Government observed that the continuance of the scheme would largely depend on the success of their first experiment.

We make no apology for reverting to the subject in this issue, as we find that the Madras Board of Revenue has assumed, towards the experiment, an attitude which, if left uncriticised, is likely to damp the well directed ardour of Government in this respect. In its review of the administration report of the Registrar of Co-operative Societies for the year ending 30th June 1914, the Board observed as follows — “In paragraph 30, the Registrar refers to the execution of sanitary works by Co-operative Societies and expresses the hope that the policy may be extended. The Board has already given its opinion on this point and has little more

to say. It earnestly and respectfully begs Government not to continue the experiment. Habits of orderliness and good citizenship are certain to be induced by co-operation well undertaken, and the way will thus be prepared for the reception of the teaching of the sanitarian, the employment of societies as contractors for petty sanitary works can teach but little. The report of the past year shows how seriously co-operators have failed to carry out their responsibilities to their societies and how much they have yet to be taught. They have more than enough to learn as it is, and it is undesirable to divert the attention of societies outside the scope of their legitimate duties." This dogmatic assertion of the Board of Revenue elicited the following almost apologetic explanation from Government—"The enlistment of Co-operative Societies as agencies for the expenditure of sanitary grants is in the nature of an experiment as has been separately explained to the Board and the Government do not contemplate any extension of that development unless and until actual experience is found to warrant it."

We have pointed out in our last issue the large measure of success that has already attended this first experiment of Government. In our opinion the time has come for a much more extended and sympathetic application of the experiment, while an abrupt termination of it on the strength of the Board's view would be a most deplorable step to take.

Speaking for ourselves, we have no misgivings as to the ultimate success of the scheme. It is a matter of history that in this country village communities were capable of considerable corporate activity in the past and that ancient rulers did not hesitate to invest them with a considerable degree of autonomy. Although under the individualistic influences of modern days and the system of Government introduced into the country by the British, this corporate spirit has died out in the more materialistic departments of life, it has survived unimpaired in the sphere of charitable and religious activities for which this country has been always famous. The co-opera-

tion of villagers for the purpose of celebrating a local festival or the construction of a drinking water well or pond, a chatiam, a temple or a water pandal is a matter of every day occurrence, nor is it an unknown fact that in almost every village a common fund is maintained for meeting the common expenses of the village. Fishery rents and sale proceeds of vital grass growing on communal lands are set apart by villagers in some districts for such purposes, while in towns, especially in the south, merchants contribute to a fund known as *മാലിശ്ശ* (*Malishsh*) which often supports charities of a gigantic magnitude. From the maintenance of charities to the maintenance of sanitation is not a far step, and if one observes carefully one will find that corporate action among villagers in the sanitary field is not altogether absent even now and that the sanitation of villages is often very much better than that of towns not highly organised. Villagers are not altogether ignorant of the advantages of sanitation and realise very largely the necessity to keep villages and their immediate environments clean from an innate desire to avoid offence to the senses, if not from a lively recognition of the evil effects of insanitation. In many a village, a paid agency is maintained by the voluntary contributions of the villagers for sweeping the streets, removing night-soil, and cleaning the village site of noxious weeds. Even lighting is in some villages provided in this way.

Such being the case, one wonders why there need be so much hesitation to take advantage of the existence of co-operative societies to emphasise the benefits of corporate action for the improvement of rural sanitation. The benefits of co-operation in general have already been so far recognised that it has been considered necessary to create a co-operative department in the administrative machinery of the country. It is true that the immediate object of this step was the creation of facile credit and the relief of indebtedness, but the Government and the people have already come to feel that unless the co-operative movement embraces other spheres of activity, its full benefit to the community would be lost, and

the principle of co-operation is accordingly being slowly extended to manufacture, agriculture and trade

The utilization of co-operative societies for the improvement of rural sanitation would be but an extension of this policy, while its distinctive merit would lie in the fact that it would touch the dominant chord of rural co-operative spirit at one of its most responsive points and help to enliven that spirit for the benefit not of rural sanitation alone but of many other useful spheres of rural activity as well. In other words, the popularity which the co-operative movement stands to gain by its application to the department of sanitation, where results usually take the most tangible shape, is such as would make its acceptance more easy wherever it could be usefully applied

The Board of Revenue lays emphasis on the failure of co-operators to carry out their responsibilities to their societies and wants it to be inferred that it is undesirable to add to these responsibilities. The Board is here referring evidently to the responsibilities attaching to the credit side of co-operation and forgets that other responsibilities which may be properly attached to co-operation may not be equally unpleasant or difficult to discharge. It cannot be denied that the responsibilities connected with the punctual payment of interest or repayment of moneys borrowed require an amount of moral strength and habit of self-control which it may not be easy to find among villagers in the early stages of co-operation and which it takes time and strenuous effort to foster, but duties such as those relating to the improvement of rural sanitation which consist not so much in finding funds as in expending them to the best advantage of the community are less difficult of achievement and are likely to be taken up with alacrity and performed with zest. As already stated, the great argument in favour of affording facilities for the exercise of the co-operative spirit in this direction is the indirect effect it is sure to have on the progress of the co-operative movement in general

Another advantage which is likely to accrue from a steady extension of the policy of entrusting the improvement of rural sanitation to co-operative societies is the inducement thereby afforded to the proper utilization of the common good fund of these societies. Under section 34 of the Co-operative Societies Act II of 1912, co-operative societies may contribute $7\frac{1}{2}$ per cent of their net profits to a charitable purpose as defined in section 2 of the Charitable Endowments Act of 1890,* and the by-laws of most societies provide for a common good fund. It will be seen from the administration report of the Co-operative Registrar for the year ending 30th June 1914 that the total net profits of agricultural and non-agricultural societies amounted to Rs 1,86,976 and the amount available for the common good fund was Rs 14,023. Net profits of co-operative societies are rapidly on the increase. For the year ending 30th June 1915 the total net profits of agricultural and non-agricultural societies amounted to Rs 4,81,698 and the portion capable of being utilised for the common good fund, to Rs 36,112. Considering that the amount reported in the latest review by the Local Government of the working of local boards and Union Panchayats in this Presidency as having been spent on the construction and repair of drinking water wells and tanks and the improvement of village sites, namely, Rs 8,23,743, Rs 6,42,411 and Rs 5,91,608 for the years 1914-15, 1913-14 and 1912-13 respectively, include expenditure on such works both in villages and in Union towns and in view also of the fact that the sums expended by local bodies on rural sanitation in recent years are composed largely of Government grants which, in consequence of the war, are not likely for a long time to be repeated, the amounts available from the common good fund of co-operative societies for such purposes are by no means a negligible factor, especially as such sums are likely to be supplemented by voluntary contributions from the more charitably inclined, of whom there are not a few in villages.

* Under Section 2 of the Charitable Endowments Act, VI of 1890, "charitable purpose" includes relief of the poor, education, medical relief and the advancement of any other object of general public utility, but does not include a purpose which relates exclusively to religious teaching or worship.

It is earnestly hoped that Government would take early steps to give the scheme a more extended and sympathetic trial

Tuberculosis.

[By DR M SRINIVASA RAU, M A , M D , B SC , D P H ,
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ONE of the most widely prevalent diseases, especially in civilised countries is Tuberculosis. It is a disease of protean form, due to the invasion of any organ in the body by the tubercle bacillus. Even animals are not exempt from the attacks of this bacillus but those kept in confinement are more particularly susceptible. Various kinds of fish, birds, cattle, pigs and the higher apes suffer from different manifestations of this disease.

In studying the epidemiology of this disease, no fact comes out more strongly than the great variation in relative susceptibility to Tuberculosis which is noticeable in the different races of man. Europeans show a high degree of natural acquired immunity. Still the ravages of this disease are so wide-spread that it has been termed the White Man's Plague. It was with reference to tuberculosis that King Edward VII uttered his famous aphorism "If preventable, why not prevented?" When European civilisation was carried to various parts of the globe, the diseases from which the Europeans suffered, extended the sphere of their operations amongst races who had no previous experience of them. Small-pox, Measles and Tuberculosis may be taken as typical examples of what diseases can do in decimating the aboriginal races of North America, Australia and Africa. On the other hand, the Jews as a race appear now to be possessed of a high degree of immunity. Tuberculosis of the lungs was not unknown to the ancient Hindu physicians. It cannot therefore be said that the disease was introduced into India by the Euro-

peans The Indians as a whole may be said to have been evolving some amount of immunity to tuberculosis, though it is not as high as in the case of the Jews

There are various factors which predispose human beings to the attacks of Tubercle bacillus The most important of these are the artificial conditions under which men live on account of advancing civilisation and social custom As long as men were living in a state of Nature without any clothes or houses, the micro-organisms did not affect them much But when natural environments were changed into artificial ones, the microbes and among them the Tubercle bacillus, began to find a favourable soil in the human body for their growth and development But when the surroundings were still further modified by large numbers of people crowding together in towns and cities, slums came into existence and over-crowding became excessive as a natural consequence of the inequalities in the distribution of wealth The Tubercle bacillus found itself in the most congenial atmosphere In a modern town, hardly a man can escape taking in Tubercle bacilli at each breath But fortunately man has been undergoing changes during this struggle for existence and the Tubercle bacillus cannot thrive in the tissues which offer a modicum of resistance to its attacks

Heredity has been credited with being another important factor in the spread of Tuberculosis Scientific investigations have abundantly proved that Tubercle bacilli are not transmitted by either parent to the embryo It is *after* birth and in the insanitary conditions in which parents live, that the child, like everybody else, gets the Tubercle bacilli into its system What is really transmitted is not the Tubercle bacillus but a constitutional weakness which renders the tissues of the child offer no adequate resistance to the onslaughts of the Tubercle bacillus Many such children are born of parents who may both be in their teens or one of whom is young and the other old The Tubercle bacillus finds easy victims in the offspring of such ill-assorted marriages

Another common pre-disposing factor is the pursuit of unhealthy occupations, working for long hours in ill-ventilated and overcrowded factories and workrooms. The constant breathing of vitiated air, possibly laden with infected dust, lowers vital resistance on the one hand and favours the growth of micro-organisms on the other. Poverty and alcohol are powerful allies of the Tubercle bacillus. Poverty means lack of sufficient nutritious food and exposure to conditions the reverse of sanitary. When poverty is combined with addiction to alcohol, the body is placed in the most favourable conditions to invite the Tubercle bacillus to make it its home. The wonder then is not that so many fall victims to the Tubercle bacillus, but that any of them escape at all. This is said to be an age of industrial progress in India and those interested in it should take care not to reproduce the slum conditions which are bound to occur in industrial towns if things are allowed to drift. Wherever there is any likelihood of the aggregation of large bodies of workers, provision must be made for housing them under sanitary conditions, and no facilities must be given to them to indulge in strong drink.

For the spread of all forms of Tuberculosis two factors are essential — (1) The increased virulence of the Tubercle bacilli and (2) the diminished natural resistance or immunity on the part of the host. During intra-uterine life, the embryo is safe from the bacilli. After birth and while it is breast-fed, the child has a high degree of immunity. But when the general resistance is lowered either through chill or hunger or bad feeding or accidental injuries or during recovery from Measles, Whooping-cough, etc., the child becomes open to tubercular infection and numbers of children die of it. During adolescence, i.e., from 12 to 18 years, attacks of Tuberculosis are less frequent and less severe. Probably the weakly ones who are either born naturally susceptible or are unduly subjected to infection by Tubercle bacillus, have succumbed and the survivors are a relatively hardier race. When early maturity is reached the struggle for existence becomes keener, overworked

and perhaps undeified, shielded in many ways from the invigorating influence of sunshine and fresh air, both sexes then frequently succumb to the acuter forms of Tuberculosis.

Tuberculous infection enters the body by the air passages or the alimentary canal. Milk from tuberculous cows has been commonly credited with the causation of tuberculosis in children. This belief does not rest on any secure foundation. It is rarely that cows in India suffer from Tuberculosis and rarely still to find Tubercle bacilli in their milk. Our aim ought no doubt to be to provide for a pure milk supply from well-ordered dairies and clean, well-ventilated and well-lighted cowsheds. But the importance of giving attention primarily to cow's milk rather than to other hygienic measures for the prevention of consumption is undoubtedly overrated.

Consumption as a cause of death may be said to stand on the tripod of "bad feeding", "bad housing" and "bad habits". This is most common in the midst of poorer neighbourhoods, amongst the overworked and badly nourished classes, those intoxicated by alcohol or those crowded in excessive numbers in unhealthy dwelling places and ignorant of the elementary laws of hygiene.

In the weekly returns of deaths sent by the Health Officers of Bangalore and Mysore Cities, some of the deaths are attributed to some form or other of Tuberculosis. From a compilation made from these returns, the interesting fact comes out that in Bangalore city, in 1915, there were 192 deaths from Tuberculosis out of 2,865 deaths from all causes during that period. In 1914 and 1913 there were 189 and 144 deaths out of a total mortality of 3,356 and 2,733 respectively. Thus in the last triennium there were 8,954 deaths from all causes and Tuberculosis accounted for 525 of them. That is to say, 6 out of every 100 deaths are due to consumption. In Mysore City there were 183, 193 and 151 deaths from Tuberculosis out of a total mortality of 2,020, 2,599 and 1,897 in 1913, 1914 and 1915 respectively. In other words Tuberculosis accounted for 527 out of 6,516 deaths. To express it in another way,

8 out of 100 deaths in Mysore are due to consumption. In Kolai Gold Fields an important centre of industrial activity the large number of deaths registered as being due to consumption shows that it has not escaped the evils of insanitation, overcrowding and inebriety. In 1914 and 1915 there were 124 and 119 deaths out of a total mortality of 2,741 and 2,271 respectively. Thus Tuberculosis was responsible for 243 deaths out of the total 5,012. To make this comparable with the figures for Bangalore and Mysore cities it may be said that 5 out of every 100 deaths are due to consumption. Similarly in the Civil and Military Station of Bangalore, 645 deaths from Tuberculosis were recorded from 1st April 1913 to 29th February 1916 inclusive, the total mortality for the same period being 9,983. In other words, 6 out of every 100 deaths are due to the ravages of Tuberculosis.

In speaking of vital statistics it must be borne in mind that the recorded causes of death are comparatively few. In the absence of any law requiring a medical certificate for verifying the cause of every death, the Health authorities have to be content with recording whatever cause of death may be mentioned by the relatives or friends of the diseased. We may therefore safely assume that among the Protean group "other causes" are included at least as many deaths from Tuberculosis as are actually said to be due to it. Tuberculosis being such a contagious and slowly progressing disease, it is possible to say, without overstating the case, that for every one case that dies there are at least five suffering from the disease to a greater or lesser degree and in one form or other. Thus we arrive at the conclusion that in Bangalore with a population of about 88,000, there are on the lowest calculation 1,750 persons afflicted with Tuberculosis. Similarly, Mysore with a population of about 71,000 has 1,755 sufferers from consumption. This means that one out of every 50 in Bangalore and one out of every 41 in Mysore has Tubercle bacilli in his or her system and acting as a focus for the spread of the disease. From the figures at my disposal, I find that of the nine

divisions into which Bangalore has been partitioned for Municipal administrative purposes, the third division which comprises Siddekatte, Allepet, and Akkipet is the worst, the second division comprising Balepet, Daizipet, and Huniipet, coming next. The first, eighth, and ninth divisions are the best, the others occupying an intermediate position.

Another very remarkable fact comes out from the study of vital statistics so far as they are available. Out of 525 deaths from Tuberculosis in Bangalore in 1913-14-15, 161 occurred among men and 364 among women. In other words, out of every 100 deaths from Tuberculosis, women accounted for 70 and men only for 30. In Mysore, out of 527 deaths in the same triennium, 122 deaths occurred among men and 405 among women. That is to say out of 100 deaths, women accounted for 77 and men only for 23. Taking the two cities together, Consumption is about 3 times more prevalent among women than in men. In the Civil and Military Station, Bangalore, of the 645 deaths, women accounted for 423 deaths and men for only 222. In other words, 65 per cent of deaths from Tuberculosis were among women and only 35 per cent among men.*

The population of Kolar Gold Fields is composed chiefly of working men, many of whom have no families with them. Thus in 1914 and 1915 consumption claimed 167 men and only 76 women. If a proper system of compulsory registration of vital statistics had been in force, we could draw some interesting inferences regarding the influence which race, age, social customs, diet, etc., exert on the incidence of Tuberculosis. But this is impossible, as things are at the present day. At any rate statistics confirm the experience of medical

* The writer's observations coincide with the results reported by the Health Officer of Calcutta in his Report for 1914-15. He says—"The most striking feature of the statistics relating to tuberculosis in Calcutta, however, is the overwhelming preponderance of females attacked. The mortality rate amongst females was 3.6 per thousand, compared with 1.8 per thousand, among males, i.e., females suffered more than twice as severely as males. The saddest feature of the returns is that the excessive mortality amongst females occurs chiefly amongst girls of 10-20 years of age and young women of 20-30."—Ed

men that consumption is very prevalent among the Mussalman ghosha women. They are deprived of the chance of having a breath of fresh air, being always cooped up in the zenanas. Thus consumption is not only a contagious disease but a "social" one. All the advances achieved in Hygiene by the community as well as by the individual, *e g*, improvement in houses, bodily cleanliness, nourishing food, cheaper necessaries of life, physical work properly regulated, suppression of alcohol and sanitary education of the people contribute to limit its ravages.

In the early stages many cases of consumption are amenable to treatment and consequently early diagnosis is of the first importance. It is for this purpose and for the treatment of early cases that special dispensaries are so badly needed in large cities. The tuberculosis dispensary methods are quite different from those of the ordinary outpatient departments of General Hospital. Special training of medical men in the diagnosis and treatment of tuberculosis is necessary. Therefore in any organisation against tuberculosis, a central dispensary is an essential factor. Various functions and activities are centred in this institution. It is the information bureau of tuberculosis in any given area, to which any one interested in any aspect of the subject can come for advice and guidance. To it resort patients recommended by other agencies such as charitable, religious and health societies. It may be said to be the receiving house within easy access of those points where the disease is most prevalent. Patients come here in any stage of the disease. They are examined, diagnosed, advised and treated. It acts as a centre for domiciliary treatment. A direct attack is made on the sources of the disease. A nurse visits the houses of the patients to see that the doctor's instructions as to open-windows, separate sleeping accommodation, disposal of the sputum, preparation of food, the cleaning and general hygiene of the house are carried out. The condition of the other members of the household is noted by the Medical Officers who visit the houses.

thus discovered and proper advice is given. The dispensary acts as an educative centre for the community. By the constant distribution of literature and the arranging of various lectures and addresses, there is not only awakened an interest in the tuberculosis problem but also that interest is focussed on the practical activity of the various units of a co-ordinated scheme. The dispensary acts as a sort of clearing-house for the area in which it works. The patient with early active disease for whose cure, rest, postural exercises, and graduated activity under the best hygienic conditions are essential, is sent to the sanatorium. The infected child who does not gain weight while attending the ordinary school is sent to an open-air school. The advanced and dying cases living under conditions favourable to the infection of others and in houses where supervision and suitable treatment are difficult of attainment are transferred to hospitals for advanced cases, not only in their own interest but for the protection of the community. Suitable cases are sent from the sanatorium to a farm colony where further treatment may be necessary to obtain for the patients not only a clinical but also an economic cure. Lastly, the dispensary notifies the Medical Officer of Health of all cases of the necessity for disinfection, after death or removal or during the lifetime of the patient and of any other circumstances which might call for his intervention. A large proportion of patients can be treated from the dispensary in their own homes without interfering with their occupations. They however come to the dispensary on particular days to receive tuberculin injections. This Edinburgh system for the control and eradication of tuberculosis was initiated more than a quarter of a century ago by Sir Robert Philip. Its success has been proved by its adoption in practically every civilised country. So far as I know, Bombay and Lahore are the only two places in India where special dispensaries for diagnosis and treatment of tuberculosis have been established. In these places the Municipalities have realised the seriousness of the situation and also their own responsibilities in the matter.

As stated above, the Central Tuberculosis Dispensary is only one factor. To ensure any measure of success, it must form part of a comprehensive scheme which ought to include a sanatorium, a hospital for advanced cases, an open-air school, a farm colony and a Public Health Authority.

In many countries legislation has provided for compulsory notification of all cases of consumption that may come under the notice of medical practitioners. It has never been popular nor has it worked satisfactorily. The disease is one of long duration and mere notification without ample provision for compulsory segregation, is doomed to failure. Our experience of compulsory notification and isolation of patients stricken with plague is such that there is no likelihood of our resorting to similar measures with regard to consumption.

Legislative enactment about the inspection of dairies, cowsheds, and slaughter houses is a good general sanitary measure and as such it may be welcomed, but as a means of controlling tuberculosis, it must take a secondary place, as the evidence of milk and meat being important agents in the spread of tuberculosis is at best slight.

Where legislation may usefully step in, is in the direction of preventing indiscriminate spitting, which is a serious danger to the community. The practice itself is disgusting and there can be no two opinions regarding the necessity of keeping places of public resort clean and unpolluted. A Municipal regulation, if not a legislative enactment prohibiting indiscriminate spitting in trains, trams, public conveyances and public buildings will have a real educative value in towns like Bangalore and Mysore where there are large numbers of educated people. Though such an enactment cannot be rigorously enforced, it will make the community realise the seriousness of the practice. What our Municipalities ought to do, is to take measures for the allaying of dust in the roads, especially in these days of motor cars. Any one who has had the misfortune to walk along a dusty road when high winds prevail and a motor car dashes by, will sympathise with me in my contention. Dust is inimical.

to general health and specially affects the eyes and lungs. The particles of dust laden with tubercle bacilli from dried sputum, are inhaled by almost everybody. Street watering on metalled and gravelled roads is useless. Its benefit is at best transitory and by assisting the disintegration of the surface leads to the production of dust in greater quantities. This has been our common experience in Bangalore. In all roads where traffic is heavy and incessant, tar and tar compounds applied cold to swept surfaces give good results. A patent preparation named Tarco is said to give better results but it is more costly. The less dust there is on a road the greater are the chances of sun's light and heat killing the tubercle bacilli.

In any organised fight against tuberculosis the greatest enemy we have to contend against is ignorance. Any measures taken to dispel this ignorance will bear the greatest fruit. We have to turn to the Department of Education to assist us. Education and sanitation must always go hand in hand and any divorce between the two is unnatural and greatly to be regretted. Our combat with any disease will be easier if the people for whom we work are sufficiently educated to second our efforts. As it is, we have at present to meet the passive resistance, if not the active thwarting, on the part of the people in the carrying out of any sanitary improvements. Formation of anti-tuberculosis societies, popular lectures, and free distribution of pamphlets and leaflets are the means of educating the public to a better sense of their responsibilities in the matter of preservation of public health.

In the abolition or reduction of consumption, school medical inspection and the treatment of the physically unfit school children are almost certain to play a considerable part. When this measure is brought into effect and school Medical Inspectors detect consumptive school children, information of the greatest value will be collected. Some really definite notion of the extent to which children of school age are the subjects of this disease will be arrived at and doubtless steps to establish open-air schools and any other system of treat-

ment and prevention will be more readily taken. Thus the disease will be brought more under control at the earliest moment and almost certainly with the best possible results.

After all, the struggle against tuberculosis by means of legislative measures such as compulsory notification of all cases, compulsory segregation of infected persons and destruction of all infected milk and meat, is at best a hopeless task. We can never hope to deprive Nature of her power to kill off those who have inherited vulnerability. Natural selection is stungently operating on man and will remove those individuals in whom no 'elasticity of resistance' exists. The evolution of man and of the tubercle bacillus on mutually antagonistic lines, seems likely to proceed till the end of time. Only by the gradual establishment of natural immunity, built step by step by successive generations who have successfully resisted its attacks, can freedom from the disease be at last attained. Thus we must believe that acquired immunity is becoming more and more a feature of urbanised population. The benign lesions contracted in infancy remain indefinitely latent and they generally confer upon those who have them, a manifest resistance in regard to ultimate reinfection to which they may be exposed, so that they become protected from the serious forms and rapid evolution of tuberculosis. Any compulsory isolation of persons suffering from tuberculosis may actually retard rather than assist the struggle against consumption. This it would do by lessening the risk of infection of the community and interfering with the law of natural selection and survival of the fittest. What can and should be done is to place all individuals from birth onwards under conditions most conducive to the maintenance of good health, so that they may encounter infection successfully, remembering always that overwork, underfeeding and bad housing are the surest preparations for the disease. It is only when economics, social legislation and philanthropy co-operate with medical science that what may be termed Public Health can come into existence.

Free Libraries in Baroda.

AMONG the numerous conferences that are being held in the hot weather in several districts of the Madras Presidency, the curious reader of the newspapers will have remarked a new and somewhat significant movement which was brought to a focus at a comparatively little known town in the district of Kistna. We refer to what was called the Kistna Libraries Conference, held on the 23rd April at Gudivada. At this conference was for the first time prominently brought to the knowledge of the public a slow and steady development of small reading-rooms and libraries, intended principally to cater for the needs and requirements of the villagers, as opposed to the English-educated townsmen of the Presidency. And one of the resolutions that was passed at this conference demanded the active aid of municipal and local bodies to further the growth of this movement, which apparently styles itself as of the people and for their particular benefit. In these days we are familiar with the phenomenon that what is once articulately demanded by a section of the people at one place is taken in hand by others at other places and pressed forward to the attention of the Government as well as the general public, we may therefore take it that sooner or later it may become an important question for the local bodies to decide how far they will be justified in diverting any portion of their slender and inelastic revenues to meet and control this new demand on them. To help our readers in understanding this problem and estimating its relative importance, we propose to give here a very brief account of a similar demand which was created and developed in the Native State of Baroda.

For, in this particular as well as in other matters, this little State is ambitious of being the pioneer in this country. We all know that the State is governed by a Ruler who has won the reputation of being absolutely fearless and tireless in making new and daring experiments in the art of adminis-

tration. And others may be permitted to learn something from the success or failure which has generally attended such experiments.

It is possible that the experiment of starting village libraries was forced on the Maharajah as an inevitable consequence of the introduction of compulsory elementary education in the State. It is a common and discouraging experience of many public servants to find that children who had undergone three or four years of training in a school are found in after-life to be almost entirely unable to read or write even their own names, so that one may well be led to think that such teaching as was given to them was entirely futile, if not worse. It would seem as if such minute doses of inoculation against ignorance and illiteracy are like inoculation against the plague: the immunity is not of long duration and has to be renewed at frequent intervals. The habit of reading is apparently not one easily acquired though it can be easily lost. And it would therefore be wise to take steps to attract the villager to good books almost insidiously, as it were, and in spite of himself, and see that the habit of reading has become so ingrained in him that, when once established, it is, like the habit of thinking, almost impossible to shake off.

Perhaps there was some such idea working in the mind of the Maharajah when he resolved to try this experiment. At any rate we are told that he was immensely struck with the possibilities of the system of free libraries developed in the United States of America and straightway decided to transplant the system to his own State.

The result has so far been marvellous. For, indeed, enthusiasm, when wedded to power and directed with wisdom, goes very far on the road to success. While in 1910 there were only about 188 subscription libraries in the State, with next to no readers and not any vitality to speak of, we find towards the end of July 1915, a total of 385 village libraries, 35 town libraries, 3 district libraries and a handsome central library

in the City of Baroda itself, having a total stock of over 2,10,000 books and a total circulation in the preceding year of over 2,20,000 books. To understand the full significance of these figures, it should be borne in mind that the total population of Baroda State is only two millions, that the number of towns in it with a population exceeding 4,000 is only 39 and the number of villages exceeding 1,000 inhabitants is reckoned at 426.

As already stated, the experiment was started in the year 1910, when His Highness appointed Mr. W. A. Borden, a trained American Library expert, as the first Director of State Libraries. The main idea in starting this movement was "to banish the pest of ignorance" from among the people. The chief lines of work were from the beginning clearly laid in the following terms —

"The library is not going to be a mere storehouse of books, but will use every means to make its books accessible to all those who want them and to see that those who need them realise that need and act accordingly. The duties of a modern library extend to the entire community, instead of being limited to those who voluntarily enter its doors. It believes that it should find a reader for every book in its shelves and provide a book for every reader in the community, and that in all cases it should do the actual work of bringing book and reader together. This requires great multiplication of facilities, such as lending books for home use, free access to shelves, cheerful and homelike library building, rooms for children and women, co-operation with schools, inter-library loans, longer hours of opening, more useful catalogues and lists, the extension of branch library systems, and of travelling and home libraries, and co-ordination of work through lectures, exhibits, and translations into vernaculars."

The above extract serves at the same time to explain what is exactly meant by the term "free libraries" in the State. We

have some examples of what are termed free libraries in this Presidency. The Connemara Public Library at Madras may serve as an example of what we generally mean by the term. Any one is free to go into the handsomely appointed reading rooms of this library, turn over the catalogue placed there, call for such books as he cares to peruse, a ready attendant serves you with promptitude, and then you are free to read away there for as long as you like, until you are tired or until it is time for the office of the library to be closed. In other words, you are free to read the books, but only in the library rooms and during its office hours, not whenever you are in the mood to read or when it suits your convenience, but as it suits the convenience of the management of the library. If you happen to be an office hack or a business man, your business hours will be much the same as the office hours of the library, you will have hardly any chance of going to the library, still less the time to stay and read the books you care about. Clearly a free library like this is not intended to lure men into the pleasant paths of reading. It is a place of business, where reading is the business transacted. That is not the idea of a free library in Baroda.

Take the case of the Central Library at Baroda City, which was developed from the old Lakshmivilas Palace Library. Here each and every citizen of Baroda is a member of the library. He can go there, select his own books direct from the shelves, and either read them there or take them home to read at his leisure. If you are not personally known to the librarian or any responsible member of the library staff, you have only to give a reference to some respectable person living in the State and give your exact address and occupation. Any State employee drawing a salary of Rs. 40 or more, any one owning landed property in the State, any income-tax payer, or mandai, in short, any person of such position and standing in the State as gives confidence to the librarian, can stand as guarantee for you, that you will not damage the books, and that is all that is necessary to enable you to take home any books from

the library. Of course reference books and specially valuable and rare works of art are not in any circumstances allowed out of the library. There is always a reasonable margin allowed for the wear and tear of books and strict and meticulous attention is not paid to trifling damages done to them by a not unreasonable handling of books by the readers. And the general experience of this policy of trust has been that there have been very few losses of books, thus proving that the number of black sheep in any large community—even though it be the reading community—is very small.

All the libraries started under this scheme in Baroda are free in the sense described above. They are classified as village, town, district and central libraries. The Central Library is the guide, philosopher and friend of all the other libraries. The District Library is entrusted with the supervision of all the minor libraries in the district. Some Town Libraries are deputed to look after the concerns of a few of the adjacent village libraries. Every library has to send in a quarterly report of its working to the Curator of the Central Library. In places which have not yet started a library of their own, the Curator is prepared to send down a set of travelling libraries, if the villagers express a desire for them. These travelling libraries consist of about 30 books, packed in well-made boxes and carefully selected so as to meet the needs and suit the tastes of the average villager. The books are allowed to remain for a period of 90 days and should then be returned to the Central Library with a short statement showing the number and kind of books issued to and used by the villagers. This return serves to indicate in what direction the tastes and tendencies of the villagers lie.

All these libraries are in part supported by the State, by private subscriptions and by contributions from the local bodies. The rule is that whatever is the amount raised annually by the villagers, an equivalent sum is contributed by the local panchayat and the State separately. To form a village library,

it is enough for the villagers to raise a sum of Rs 50 per annum from among themselves. That will give them an income of Rs 150. Out of this they are empowered to spend a maximum of 25 per cent on books, 30 per cent on periodicals, not more than 25 per cent being allowed to be spent on rent and furnishing of the library. And in the matter of purchasing of books, the Central Library comes to their aid by providing books worth Rs 100 for every sum of Rs 25 handed over to it by the village library. Each village library is managed generally by a small committee appointed by the subscribers from among themselves, the village schoolmaster being the librarian.

To form the Town Library, similarly, the townsmen have to raise a maximum of Rs 300 a year, which will be tied by the contributions from the Government and the local municipality. The maximum will have to be raised to Rs 700 if the townsmen are ambitious of raising their library to the status of a District Library. The same rule of part contribution applies to the construction of library buildings, provided that the design and estimate for the buildings are in each case passed as suitable by the Central Library Department. The minimum cost of a village library building comes to Rs 1,500, while the cost of the town library building varies between Rs 3,000 and 7,500. It may be noted that about fifteen town libraries and nine village libraries have been so far built while six town and six village libraries are in course of erection.

To enable the local bodies to meet the recurring cost of these libraries, the State is prepared to consider favourably any proposal that may be made by them to levy special taxation, as by imposing a small library rate of one or two annas, as the case may be, annually per head of the literate adult male population. But we are not aware that any local body has yet availed itself of this permission. The total State expense last year is estimated at slightly over Rs 84,000.

TOWN PLANNING AND CO OPERATION

The following table gives in a small compass an idea of the cost and rapid progress of the movement in the State

Year	No of libraries at the beginning of the year	Newly opened	Circulation of books		Cost of main tenance Rs	Cost of buildings erected Rs
			Towns	Villages		
1911 12	267	34	28,500	27,900	14,795	Nil
1912 13	301	43	31,838	37,693	32,577	50,828
1913 14	344	18	88,033	41,590	43,764	45,755
1914 15	362	61	1,21,061	52,150	51,288	57,716

Statement regarding travelling libraries

	1911 12	1912 13	1913 14	1914 15
No of cases sent	90	199	297	854
No of Books circulated	6,851	14,165	12,792	18,837
No of readers	—	6,250	6,132	7,056
Total cost	2,892	2,218	2,995	2,469

Town-Planning and Co-operation.

[BY T SRINIVASA MUDALIAR, B A , B L CHAIRMAN,
MUNICIPAL COUNCIL, ERODE]

THERE seems to be no doubt that sufficient attention is not bestowed by civic bodies on the middle classes who are the mainstay of our towns. The tyranny of the landlord over his tenants, especially in towns, is becoming more and more unbearable. The rents are raised year after year on flimsiest pretexts so that the tenant is taxed to the breaking point. Any suggestion, therefore, to help this suffering class will be a step in the right direction.

The most noticeable feature in the system of town formation in our country is the selection of low-lying marshy tracts, houses being huddled together in hollows which easily become hot-beds of mosquitoes and malaria. While being exposed to the severity of the sun such towns are denied the breeze that can alleviate the heat and which elevated areas richly enjoy. The reasons for such selection are not far to

seek In a country like ours where rains are so scanty and water so scarce, people naturally seek low grounds wherein to settle themselves so that water may be easily had The close formation of houses with little or no means for ventilation and without open space around is the natural result of want of security which the pre-British days of pillage brought about As a result, towns in general suffer from a burning atmosphere, houses have ugly frontage, streets are narrow and ordinarily the amenities of urban life are denied to the townfolk It will be a misnomer to call our miserable an-tight dwellings with their sooty appearance and dull surroundings as 'homes'

In ancient days there was some order and harmony in town formation, the arrangement being based on caste system At present, we find the caste system gradually giving way to class formation, especially in urban areas, and we are now in the stage of transition wherein there is too much of individuality and too little of interdependence One's own welfare or wealth-making is the sole consideration in house-planning, the commonweal of the community, even the convenience and comfort of one's next door neighbour, is a negligible—perhaps unknown—quantity in house construction Some method must, therefore, be adopted by which the individuality may be made to merge in interdependence so that the common benefit of the community may be secured on some solid basis And no better principle can serve such a purpose than co-operation

Trade and industries and the temptation of higher wages are attracting a large number of rural population into urban areas It therefore behoves every Town Council to take up the subject of town-planning more seriously and to provide for proper houses, purer atmosphere, and healthy surroundings at least in suburban areas

The two drawbacks of town life referred to above are gradually vanishing The introduction of pipe water supply in our towns is one of the greatest boons of British adminis-

triation The want of security has also vanished Civic Bodies may therefore take rapid strides in town-planning and town extension in suitable elevated areas A Town Planning Act, a set of building bye-laws and direct powers of acquisition are some of the elements that are urgently needed for local bodies to reach their goal in no distant date But the citizens themselves must work up their salvation They must, without losing time, form Building Societies and Tenants' Associations and help their Town Corporations in the formation of suitable suburbs The Town Councils can acquire extensive and elevated areas and plot them into suitable house sites, laying out wide roads, and making provision for parks and playgrounds The Building Society may take up the house sites and either construct houses itself and rent them to tenants or advance money to its members for such construction on the security of such sites and buildings Tenants' Associations may arrange for the combination of families which may live together in large buildings provided either by such Associations or by bigger Societies, through co-operation such families may exercise economy and enjoy life with common sites for their manufacturing and other purposes Whereas ordinarily only the richer few can command comforts and conveniences which may be necessary luxuries in civic life, through co-operation the middle class many can attain such amenities without extraordinary effort

For successful co-operation, at least in the early stages, some social tie or class formation seems necessary If so, lawyers and traders, oil mongers and artisans may form each a separate group with an association of its own but forming together members of one Building Society

For the successful working of such Associations at least for some time to come, it may be necessary for Local Bodies as well as the Local Government to patronize those Associations either by lending money on nominal rates of interest or by guaranteeing a certain percentage of profit. It may even be

worth while for Municipal Councils to grant special concessions to suburbs formed under such conditions by way of reduced taxation at least for a certain period

Manifold are the advantages of this system. By the creation of a suburban area on co-operative basis you will have raised a self-sufficient and self-reliant community which can look after its affairs in matters of sanitation, health and every day life and such corporate life will in turn stimulate a spirit of co-operation in that body. But the Town Corporation must exercise proper control over such suburbs through its building bye-laws, for a Civic Body must be the artist as well as the architect of its town.

The Madras Corporation.

Its financial position with special reference to the Drainage and Water Supply Works,

A RECENT order of the Madras Government and a reply thereto by the Corporation of Madras have focussed public attention on the finances of the City, and it seems therefore necessary to set out the exact financial position of the Corporation in the pages of the *Gazette*. So far as the merits of the controversy between Government and the City are concerned, any Municipal Commissioner of six years' standing has enough facts within his own knowledge to see with which side the advantage lies. We must confess indeed to a feeling of amused surprise at the ingenuous way in which elementary facts—long known to the 'man in the street' (of Madras)—are announced in the Government order as if they were new discoveries made by an eagle-eyed Secretariat, and side by side with these palpable truths are assertions which appear to betray a want of knowledge of the previous history of the Special Drainage and Water works. The order concludes—as all such orders do—with a direction to the Corporation to submit a "clear" statement of its liabi-

lities, of the expenditure necessary to complete the works and of the way in which they are proposed to be financed. If "clear" statements are what was needed to save the situation, the Corporation's financial salvation should have been assured years ago, for ever since Mr. Madeley took charge of the Special Works and formulated his proposals, the Corporation has been doing nothing else but submitting very clear—and, we may add, very elaborate—statements to Government showing its financial position and resources and the plans and devices for meeting the cost of the special works. We advisedly say "plans and devices", for even from a time prior to Mr. Madeley's advent and in fact even to the creation of the Local and Municipal Secretariat, both the City and the Government have recognised that the execution of an adequate scheme of drainage and water supply for Madras was beyond the ordinary resources of the Corporation and considerable financial ingenuity has been locally exercised in devising new ways of exploiting the long-suffering rate-payer. The terminal tax, a local income-tax, a liquor duty, and taxation of the Port Trust were all inventions of this fiscally fertile pre-Madeley period and if none of them has "materialised", it was certainly not the fault of the Corporation, but the blame must rest with the excessive conservatism and nervous dread of 'going up to India,' which marked the Madras Government. Nor were the commissioners content with merely throwing seed on unfruitful soil. In spite of the standing official belief—like most official beliefs it persists in the face of facts—that the Corporation is unwilling to tax itself, during this era the Commissioners twice increased the taxes with the specific object of financing these works. In 1899, they raised the rates on vehicles and animals and the import duty on timber and firewood, and in 1906 they not only enhanced the rates of license fees and of charges for supply of water for non-domestic purposes, but also the property tax to the figure at which it stood (17½ per cent) till the commencement of the current financial year. If we remember that in Madras the law does not make any

allowances for repairs in assessing immoveable properties while all the other larger municipalities permit a reduction of 10 per cent from the assessed valuations for this purpose, this rate of $17\frac{1}{4}$ per cent is the highest in India. And with the recent increase to $18\frac{1}{2}$ per cent on the gross annual valuation, the Madras rate-payer has the satisfaction of feeling that in proportion to income, he is not only the heaviest taxed individual in the country but that it will take a long time indeed before his Bombay or Calcutta compatriot can come up to the level of his civic sacrifice. If further stimulus were required to his patriotic thoughts, we can remind him of the circumstance that while he pays both a professional and a vehicle tax the citizen of Bombay does not pay the former at all, his Calcutta colleague pays only a very attenuated form of it, and the Rangoon man is exempt from both. It is a pleasing fiction that the elected commissioner will not put burdens on his electors. One had only to be present at the last budget meeting of the Madras Corporation and note the way in which an "unsympathetic" President and the "sympathetic" representatives of the "poor" rate-payers fraternised, and without one harsh word or discordant note raised, by a stroke of the pen, the house-tax to its permissible legal maximum of $18\frac{1}{2}$ per cent to be disabused of this notion. The truth of the matter is that the rate-payer is far gone, whether the person operating on him is the sun-dried bureaucrat or the sturdy representative of the people.

The Corporation has taken stock of its financial position with special reference to the drainage and water supply schemes on numerous occasions—so numerous indeed that even to refer to them all here will unduly tire the patience of our readers. The pigeon-holes of the Secretariat Offices must be full of the reports and discussions on these stock-takings, and a mere glance at them should suffice to "remind" Government that it is a work of supererogation to "remind" the Corporation of its "primary financial responsibility" for these works. The history of the Madras city drainage and

water supply works is a history of the attempts made by the Corporation to finance works which have always been hopelessly beyond its capacity to finance. And this incapacity was not a fact discovered for the first time by an amazed—and pained—Madras Government on the 28th day of February, 1916, but a truth proclaimed again and again by the Corporation and recognised as often by the Government. It is a long history, and like all histories, it has an ancient period, a mediæval period and a modern one. It will suffice here to refer to the years 1899, 1906-07, 1911 and 1914 when the Corporation reviewed in full detail its financial position and laid the case before Government. On every one of these occasions it showed how inadequate its existing resources were to meet the cost of the schemes, it suggested new sources of revenue, and concluded with pointing out that even with the added revenues the schemes could not possibly be financed without liberal assistance from Government. With all these facts before them, the Government in 1907 amended the City Municipal Act so as to provide for the appointment of a Special Engineer to take charge of these schemes, imported Mr. Madeley from England and, when he formulated his proposals, sanctioned them, though the Corporation was so doubtful as to their financial expediency that they were saved from rejection only by the casting vote of the official President. Under the circumstances even a court of law acting on a well-known principle of equity would hold that Government had made itself responsible for the works to the extent that it was bound to find whatever funds the Corporation could not provide itself either by existing taxation or by the new sources suggested by it. The Corporation has now reached the limit of taxation permitted by law, and as for new sources of revenue, though the Government order blames the Corporation for “not putting them into operation”, the Corporation cannot put them into operation without an alteration of the law, and action in this direction has to be taken not by the Corporation but by the Government. Under the circumstances

it will be wise for Government to drop the tone of injured innocence and in co-operation with the Corporation to see how far the new situation developed by the war should modify the schemes already sanctioned. For it is really a case of the war upsetting calculations of the pre-war period and the financial *impasse* in which the Corporation finds itself is only one instance of the disturbance. Government always intended to assist the Corporation in the execution of these schemes and in the past have made year after year liberal annual grants for the purpose, but the financial stringency produced by the war precludes further assistance and that is the secret of the present trouble. It would certainly have been more business-like if instead of recurring annual benevolences, the amount of which varied from year to year and depended upon the pressure put by the President and the Corporation's representative in the Legislative Council on the financial department of the Secretariat, Government had decided once for all how much it would allot for the execution of these works and told the Corporation to find the rest of the money. This is exactly what the Corporation wanted the Government to do in 1911 when it reviewed its position and arrived at the conclusion that after straining all its resources it would require a grant of 75 lakhs in the aggregate to execute the schemes. Those were spacious times when the Government of India had surpluses which it knew not what to do with, and if the Madras Government had displayed the same keenness as the Government of Bombay, the three-quarters of a crore could doubtless have been coaxed out of Simla. Routine however ruled the Secretariat and the Corporation was told that its request was *premature*. It now finds it is too late!

There is no use however crying over spilt milk. We have to accept the situation as it has actually developed and decide the future course of the special works. The total cost of these works according to the latest estimate framed by Mr. Madeley—Mr. Madeley's estimates have a habit of growing from year to year—is 225 lakhs. Up to date

about 110 lakhs have been spent and that leaves 115 lakhs to be provided for. The law limits the Corporation's powers of raising future loans to 80 lakhs. If Government cannot make any further grants it is clear that the Corporation cannot proceed with the works in their original shape. The estimates will have to be cut down by at least 35 lakhs. A loan of Rs 14,80,000 will be discharged in 1923, but the amount so set free plus any additional amount that may be made available by natural increase in the assessed valuation of the City will doubtless be reserved by the Corporation for general borrowing purposes, a growing city cannot afford to exhaust its borrowing powers on a single scheme, however important.

A further consideration, however, now comes in. The Corporation may lawfully borrow 80 lakhs to finance the special works—that is with reference to the legal or theoretical limit. But there is a narrower limit, *i.e.*, of the practical ability to repay. A loan of 80 lakhs means an additional burden of Rs 4,86,000 thrown on the revenue budget of the Corporation for the next 30 years. Is that budget in a position to bear this recurring charge? This is an important point, as no local body which aspires to reasonable independence can afford to look forward to annual grants to meet its normal expenditure. It is a very different matter from asking for assistance to execute *capital* works of great magnitude.

An examination of the revenue budget of the current year shows that the normal expenditure is in excess of the normal receipts by Rs 2,91,000. In arriving at normal figures we have excluded all unusual items of receipts and charges and fixed, for “new works,” an average annual expenditure of Rs 1,80,000 as the standard. The Revenue Officer's printed note of 6th May 1914, which was at the time considered by the Corporation, shows that the average expenditure on this purpose during the five years preceding that note was Rs 2,10,000. But that was an era of large opening balances and the Corporation was liberal in its allotments for new works,

and if an average is taken for 12 years, Rs 1,80,000 would be found nearer the mark. If the normal expenditure as deduced from the current budget is to be assumed to represent the meducible minimum of future expenditure, then it is obvious that the revenue budget cannot stand the slightest additional burden and the Corporation must forthwith shut down the Special Works. And not only that, the Corporation must set about—and that at once—to find additional revenue to the extent of nearly three lakhs to enable its receipts and charges to balance. If it cannot do this, the only course open to it in common honesty is to suspend business and apply for relief on the Insolvency side of the High Court.

This opens up an inquiry as to the possibilities of increasing the revenue and reducing the expenditure, and in making this we shall do well to adopt as a starting point the forecast which the Corporation made in 1914 in response to a reference from Government. The results are available in printed papers, copies of which were furnished to the Corporation and it is somewhat surprising that when passing the budget for the current year, no commissioner thought of comparing its figures with those prepared in 1914. Taking first the income side of the budget, the present budget has more than realised the anticipations of 1914. The normal expansion of the then existing taxes was expected to bring in a revenue of Rs 19,52,450 in the current year. As a matter of fact the budget shows—thanks to the Revenue Officer—that the taxes levied at the same rates as in 1914 yield an income of Rs 20,67,000. Under municipal property and powers apart from taxation, there has been a fall but that has been more than counterbalanced by an increase under “miscellaneous.” So far as the income side of the budget is concerned, the budget has more than maintained the anticipations formed two years ago, and is a further proof that the Corporation can by no means be accused of tenderness to the rate-payer. A scrutiny of the expenditure, however, reveals results which we can only describe as

startling Under maintenance—Drainage Works—we find that the sum provided in the current year is in excess of the estimate for the year 1913-14 by over Rs 1,31,000 and is dangerously near the figure which it was estimated to reach *after the completion* of the drainage works and the reorganisation of the conservancy department For the maintenance of water supply works, a sum of over 2 lakhs of rupees is provided in the current year, though the estimate of 1914 anticipated only a maximum expenditure of 1½ lakhs after completion of the works The expenditure on lighting after the extension of street electric lighting throughout the city was estimated at Rs 1,14,000, the current budget is in excess of this by Rs 6,000 though there has been only a partial extension, and though even existing street oil-lamps are being reduced in number Sanitation and conservancy were expected to cost in 1914, in their amalgamated state, Rs 3,86,000 Already the cost has risen to Rs 4,23,000 We notice similar increases, though smaller in amount, under hospitals, registration of vital statistics, grass farm and public parks The forecast made in 1914 was made very carefully with reference to all the future circumstances of the Corporation and there can be no good reason for the departments mentioned above to ask in the current year for allotments which, within two years of the forecast, exceed what they anticipated would be their maximum requirements ten years later The variation is specially noteworthy in the case of the Special Engineer who, in 1911, estimated that his water works would cost to maintain, *after completion*, only Rs 45,000 more and the drainage works would actually cost Rs 36,000 *less* !

The impression left by the above figures is that between 1914 and 1916 the various departments of the Corporation have been extravagant in their budgets and that the Standing Committee and the Commissioners have passed them without proper scrutiny This impression is confirmed when we look at the totals of normal expenditure This stood at Rs 25,77,000 in 1914-15 It rose in 1915-16 to Rs 30,40,000 and in the

current year to Rs 31,61,000. It is not possible to explain away these figures by saying that the expenditure in 1914-15 was abnormally low. As a matter of fact it was Rs 18,000 less than in 1913-14 and Rs 55,000 less than in 1912-13, but it was actually Rs 2,30,000 over that of 1911-12. We thus find that *the expenditure has indeed been rising beyond all proportion to the rise in the revenue*.

Seeing that since 1914-15 no reorganisation or new public service involving additional expenditure has been undertaken (except that the water works were completed, in the calendar year 1914), the obvious duty before the Commissioners was to insist on the budget being cut down to the level of 1914-15. Even if we allowed a lakh more than in that year—which should suffice for the progress made in Drainage and Water-Works—there should be a saving in expenditure of 5 lakhs of rupees. There can be no excuse for passing a revenue budget in deficit by 3 lakhs at a time when the problem of meeting heavy capital expenditure is taxing to the utmost the ingenuity of the Commissioners.

Assuming that the Commissioners are able to bring pressure to bear on the executive and cut down the budget by 5 lakhs—judging from past experience this assumption is not likely to be realised—they will be able to convert the deficit in the budget into a surplus of 2 lakhs. If the normal rate of expansion of the revenues, as laid down in 1914, is kept up, they should be adding Rs 40,000 every year to their income. But in view of the continuance of the war and the gloomy financial period that is sure to follow it, it will perhaps be safer to take credit for only half of this and assume that the revenues will rise annually only by Rs 20,000. The imposition of the new taxes recommended by the Corporation in 1914, viz., terminal tax, revision of professional tax schedule, revision of license fees and enhancement of the tax on motor cars, if sanctioned by the legislature, will bring in a further revenue of Rs. 1,35,000. That is, taking a date five years hence, the

Corporation's revenue will result in a surplus of Rs 4,35,000 Mr Madeley's estimate of 1914 however provides for an additional expenditure on maintenance of drainage works of 1 lakh after their completion, so that only Rs 3,35,000 will be available This will just suffice to pay for a loan of 56 lakhs We thus arrive at the conclusion that if the *legal* limit to the Corporation's borrowings in behalf of the Special Works is 80 lakhs, the *practical* limit is 56 lakhs This is of course subject to the assumption that the Commissioners are able to cut down the expenditure by 5 lakhs in the current year and will restrict the executive to a total expenditure not exceeding Rs 26,61,000 in the future If we assume that they will not be able to convert the deficit into a surplus but that they will just make both ends meet and keep the expenditure at the same level in future years, then the sum available five years hence to pay for loans will be reduced to Rs 1,35,000 and this will reduce the practical limit to loans for the Special Works from 56 lakhs to 22 lakhs

The conclusions we wish to lay before our readers are these

(1) The Corporation is entitled to look to Government for future assistance in completing the special works, but in view of the war and the strain on the finances of Government, it is unlikely that Government will be able to help

(2) 115 lakhs are required to complete the Special Works The Corporation can theoretically provide 80 lakhs by borrowing but really cannot afford to borrow beyond 56 lakhs And even this 56 lakhs can be provided only on the assumptions (a) that the Corporation is able to cut down the current and future normal revenue expenditure by 5 lakhs, and (b) that the Legislature will help the Corporation by promptly sanctioning the new taxes proposed by the Corporation in 1914

(3) If the Corporation cannot cut down the revenue expenditure by 5 lakhs but will make both ends meet by

cutting it down by 3 lakhs, it will be able to borrow for the special works only a sum of 22 lakhs. And even this is subject to the assumption that the legislature will sanction the imposition of the new taxes.

(4) The Corporation must make up its mind between courses (2) and (3) put above, and reduce the estimates for executing the Special Works from 225 lakhs to 166 lakhs or 132 lakhs.

(5) It is not open to the Corporation to say that it will not elect either of the courses (2) or (3) but will leave the expenditure at the figures sanctioned in the budget. Apart from the fact that this will necessitate the immediate closure of the Special Works, this will most certainly lead to insolvency and necessitate the suspension of business by the Corporation.

(6) Even apart from the absolute necessity of retrenchment, the expenditure provided in the revenue budget is 5 lakhs in excess of any previous year's expenditure (other than last year) and is absolutely unreasonable.

There is absolutely no use in a policy of drift and letting things take care of themselves on the off-chance of the Corporation's revenue coming out bigger than anticipated or the Government making a grant in a fit of generosity. The Commissioners must look facts in the face and take decided action. We anxiously look forward to the orders of the Government on the budget which the Commissioners have with a light heart and an easy conscience, so hurriedly passed.



Ideals of Local Self-Government, Town Planning, and Architecture, in Ancient and Modern India.

IV Town-Planning and Civic Ideals in Kautilya's Artha Sastra

[BY K S RAMASWAMI SASTRI, B A , B L]

W E next proceed to the building of houses. The fastening of the roof of a house to the transverse beam by means of iron bolts is called *setu*. In conformity to the stability of the *setu*, houses shall be constructed. Not encroaching upon what belongs to others new houses may be constructed.¹ The foundation shall be two *matras* by three *padas*. Except in the case of temporary structures for the confinement of women during 10 days, all permanent houses shall be provided with a dunghill (*avashana*), a water-course and a well (*udapanum*).² A violation of this rule shall be punished with the first amercement. The same rule shall hold good regarding the necessity of constructing closets, pits, and water-courses on festive occasions. From each house a water-course of sufficient slope and 3 *padas* or 1½ *matras* long shall be so constructed that water shall flow from it in a continuous line and fall from it into the drain.³ Violation of this rule shall be punished with a fine of 54 *panas*. Between any two houses or between the extended portions of any two houses, the intervening space shall be 4 *padas*, or 3 *padas*. The roofs of adjoining houses may either be 4 *angulas* apart, or any of them may cover the other.⁴ The owners of houses may construct their houses in any other way they collectively like, but they shall avoid whatever is injurious. With a view to ward off the evil consequences of rain, the top of the roof shall be covered over with a broad mat not blowable by the wind. Neither shall the roof be such as will easily bend or

¹ Shama Sastri's Translation, page 211
² Do do page 211
³ Do do page 82-83
⁴ Do, do page 212

break Violation of this rule shall be punished with the first amercement The same punishment shall be meted out for causing annoyance by constructing doors or windows facing those of other houses except when these houses are separated by the King's road or the highroad¹ If a pit, steps, water-course, ladder, dung-hill, or any other parts of a house offer or cause annoyance to outsiders, or any other parts of a house offer or cause annoyance to outsiders, or in any other way obstruct the enjoyment of others, or cause water to collect and thereby injure the wall of a neighbouring house, the owner shall be punished with a fine of 12 panas If the annoyance is due to faeces and urine, the fine shall be double the above² The water-course or gutter shall offer free passage for water, otherwise the fine shall be 12 panas³ Harm due to the construction of unstable houses was treated and punished as assault (see Shama Sastri's Translation, page 293) The above provisions show a great deal of practical wisdom The following rules also may be noted in this connection The same fine (12 panas) shall be meted out not only to a tenant who, though asked to evacuate, resides in the house, but also to the owner who forces out a renter who has paid his rent, unless the renter is involved in such acts as defamation, theft, robbery, abduction, or enjoyment with a false title He who voluntarily evacuates a house shall pay the balance of the annual rent⁴ If any one of a party does not take part in the construction of a building which is intended for the common use of all the members of that party or if any one obstructs another member of a party in making use of any part of such a building, he shall be fined 12 panas Similarly, if any one mars another's enjoyment of such a building, he shall be fined double the above⁵ With the exception of private rooms and parlours, all other open parts of houses as well as apartments where fire is ever kindled for worship or a

¹	Shama Sastri's Translation,	page 212
²	Do	do page 212
³	Do.	do page 212
⁴	Do	do pages 212 213
⁵	Do	do pages 213

mortal is situated shall be thrown open for common use¹ In regard to the construction of the King's harem, Kautilya says thus On a site naturally best fitted for the purpose, the King shall construct his harem consisting of many compartments, one within the other, enclosed by a parapet and a ditch, and provided with a door²

I shall now take up a few other municipal matters dealt with in this valuable book Mr Narendia Nath Law says in regard to medical aid at that time —

“ There were hospitals with store rooms (भैषज्यागार) containing medicines in such large quantities as could not be exhausted by years of use To the old store fresh supplies were constantly added In the Aitha Sastha there are references to four classes of medical experts, viz, भिषज् of चिकित्सका, i.e., ordinary physicians, जाङ्गलीविद्, i.e., those who could readily detect poison, गर्भव्याधि संस्था or सूतिका-चिकित्सका, i.e., midwives, and army surgeons and nurses The army surgeons with surgic instruments (शस्त्र) and appliances (यन्त्र), remedial oils (अगदस्नेह) and bandages (वस्त्र) and nurses with appropriate food and beverage, accompanied the army, and encouraged the soldiers For the treatment of the diseases of animals, there were veterinary surgeons Several steps were taken for the plantation and growth of medicinal plants and herbs Portions of fields cultivated directly under Government supervision were set apart and used for this purpose The State controlled and regulated medical practice in the land”

The laws of the realm ensured the doctors treating cases with due care and caution Physicians undertaking medical treatment without intimating to the Government the dangerous nature of the disease shall, if the patient dies, be punished with the first amercement If the death of a patient under treatment is due to carelessness in the treatment, the phy-

¹ Shama Sastri's Translation page 218

² Do do page 44

³ Narendia Nath Law's Studies in Ancient Hindu Policy, pages 91, 92, 93,

sician shall be punished with the middlemost amercement, Growth of disease due to negligence or indifference of a physician shall be regarded as assault or violence. Mr. Law says —

“ Measures were also taken for prevention of diseases. Thus, adulteration of all kinds was punished, *e g*, adulteration of grains, oils, alkalies, salts, scents, and medicines. The health of the people in cities or crowded places was secured by sanitary measures. Throwing dirt, or causing mire or water to collect in roads and highways was punishable. Committing nuisance near temples, royal buildings and places of pilgrimage, or in reservoirs of water, was penalised, but exceptions were made when this was due to disease or the effect of medicine. Throwing inside the city the carcasses of animals, or human corpses, was also visited with fines. Carrying dead bodies through gates or along paths not meant for the purpose, as well as the interring or cremation of dead bodies beyond the limits of the prescribed burial places and crematories, was also a violation of the sanitary regulations.”¹ He says again

“ It is noteworthy that there was arrangement in those days for post-mortem examination. For this purpose the corpse was smeared with oil to prevent putrefaction. All cases of violent death caused, for instance, by suffocation, hanging, drowning, etc., or by poisoning, were at once brought to the morgue, and the medical officers in charge had to find out as far as possible the exact cause of death from an examination of the symptoms, several of which are enumerated in the *Artha Sāstra*. The whole affair was subjected to a careful scrutiny, and if foul play was suspected, evidence was taken and the matter left to be disposed of in the law court.”

In the *Artha Sāstra* there are excellent rules as to insurance against famine, flood, and fire. Mr. Law says

“ As a general preventive against famine and other such calamities, it was laid down that in the Government store-house only half of the garnered articles should be used and the other half reserved.”¹

¹ Narendranath Law's *Studies in Ancient Hindu Polity*, pages 94 95
 Do do do, pages 95 96,
 Do do do, page 98

During famines, the King shall show favour to his people by providing them with seeds and provision. He may either do such works as are usually resorted in calamities, he may show favour by distributing his own collection of provisions or the hoarded income of the rich among the people, or seek for help from his friends among kings. Or, the policy of thinning the rich by exacting excessive revenue (*karsanam*), or causing them to vomit their accumulated wealth may be resorted to. Or, the King with his subjects may emigrate to another kingdom with abundant harvest. Or, he may remove himself with his subjects to seashores or to the banks of rivers or lakes. He may cause his subjects to grow grains, vegetables, roots, and fruits, wherever water is available. He may, by hunting and fishing on a large scale, provide the people with wild beasts birds elephants, tigers, or fish.¹ The King was to provide against loss by floods by causing people to remove from banks of rivers in due time during the flood season. He was further to take measures to exterminate pests like rats, locusts, injurious birds and insects and tigers. He was also to take measures against loss by fire. This was especially necessary in those days as the houses were chiefly of wood then. Vincent Smith says

“Abundant evidence establishes the fact that Indian architects before the time of Asoka built their superstructures chiefly of timber, using brick almost exclusively for foundations and plinths. No deficiency in dignity or grandeur was involved by the use of the more perishable material.”

Kautilya has laid down various wise rules in this matter. Kindling of fire shall be prohibited during the two middlemost parts of day time divided into four equal parts during the summer. A fine of $\frac{1}{8}$ th of a pana shall be imposed for kindling fire at such a time. Masters of houses may carry on cooking

¹ Shama Sastri's Translation, pages 262-263

² Vincent Smith's History of Fine Art, page 13.

operations outside their houses. If a house-owner is not found to have ready with him five water pots, a *kumbha* (a water vessel of that name), a *drona* (a water tub made of wood), a ladder, an axe (to cut off beams), a winnowing basket (to blow off smoke), a hook (to pull down the burning door panels), pincers (to remove haystack), and a leather bag, he shall be fined $\frac{1}{4}$ th of a pana. They shall also remove thatched roofs. Those who work by fire (blacksmiths) shall all together live in a single locality. Each house-owner shall ever be present at the door of his own house. Vessels filled with water shall be kept in thousands in a row without confusion not only in big streets and at places where four roads meet but also in front of the royal buildings. Any house-owner who does not run to give his help in extinguishing the fire of whatever is burning shall be fined 12 panas, but a renter is not

(To be continued)

Wood Block Pavements.

[By HENRY S. LOUD, CHIEF ENGINEER, UNITED STATES
WOOD PRESERVING COMPANY]

THERE is nothing difficult about the construction of a wood block pavement but certain simple rules must be conscientiously followed to secure satisfactory results. If these rules be ignored, defects will surely develop which will detract from the appearance and will greatly shorten the otherwise long life of the pavement.

The first cost of wood block is generally higher than that of other pavements, and can be justified only by securing the advantages claimed for it namely noiselessness, ease of maintenance and cleaning, low traction resistance, favorableness to travel of all kinds, sanitary quality and, above all, durability.

The construction work should preferably be done by a firm having the best interests of wood block at heart. As contracts are usually let, however, the bidder putting

in the lowest price gets the work, even though he has had no experience in laying wood block. Such a contractor naturally desires to make all the profit he can from his contract.

It is, therefore, essential that the work to be performed be very clearly set forth in the specifications and that competent inspectors be on the job during its execution. The specifications should be intelligently drawn and should eliminate all questionable methods of construction which, even honestly and carefully carried out, would give inferior results if carelessly or dishonestly performed.

The essential requirements of a satisfactory wood block sheet are a smooth concrete foundation, strong enough to support the traffic, and well-cresoted wood blocks of sufficient depth to withstand the wear. The joints between the blocks should be filled with paving pitch or asphalt, and there should be a single expansion joint along each curb. This sounds simple, but in practice methods and materials are often used which, while they give good results in some instances, may under a variety of conditions prove most undesirable.

Foundation

The ordinary precautions as to compacting the subsoil, examination for leaks, providing drainage, etc., should be taken. All service boxes, manholes, etc., should be brought up to grade and substantially set, so that they will not be depressed by the traffic later on. This work should be very accurately done and finished well in advance of the laying of the concrete foundation which, where once started, should proceed without unnecessary interruption.

The concrete should be laid with a perfectly smooth upper surface exactly parallel to the finished surface of the street, but below same equal to the depth of the blocks. In other words, a finished concrete pavement should be laid first, on which a wearing surface of wood blocks is placed without any cushion at all.

This is not usual practice in America, where we have permitted contractors to lay concrete with almost any kind of a top surface and cover up its defects with a bed or cushion of either sand or moistened sand and cement drawn to a smooth surface by a straight edge or a templet. This is slipshod construction and encourages an uneven concrete surface, which means varying depth of cushion and eventual depressions in the pavement.

There are good streets with sand beds, but sand holds water, is liable to shift if anything goes wrong, and may even be sucked out by motor car tires. Loose street railway tracks permit water to get under the blocks and wash away the sand. A burst water main may do the same.

A cement mortar bed is much better than a sand cushion, for it does not hold water and does not shift. If the mortar bed be fairly uniform in thickness and density, and if it has been given enough water to set the cement properly, and if the blocks are rolled before the cement starts to set, then a mortar bed should be satisfactory. In practice it is rarely uniform in thickness and density, does not get enough water, and the cement has started to set before the steam roller gets on the job. It rarely adds any strength to the foundation, although it is rich in cement, which is practically wasted.

The use of a cushion of any kind necessitates the use of a steam roller which is supposed to set each block firmly in the bed. The roller cannot do this. It creates a smooth surface and does jam a large proportion of the blocks 'home,' but unless the bed and blocks are each of quite uniform thickness a large number of blocks do not get the full effect of the roller. This is particularly true of blocks adjacent to car tracks. After a period of watchful waiting the wagon wheels will find most of these blocks and cause ruts and depressions.

In repairing street openings or in replacing disturbed blocks, the surface where a mortar bed has been used is not satisfactory

There is no valid reason why a perfectly smooth concrete surface, thoroughly set should not be used. Its cost will not exceed the usual haphazard construction, for there is a saving in excavation equal to the thickness of the discarded bed, and the cost of the steam rolling is eliminated. The city engineer may see for himself the contour and condition of the foundation before the blocks are laid, and he need have no apprehension that depressions and ruts will develop later.

Blocks

Blocks manufactured in accordance with the specifications of the American Society of Municipal Improvements will give good satisfaction. The essential qualities of good blocks are

- 1 Good, sound wood
- 2 A strong wood
- 3 Protection from decay by a thorough penetration and diffusion with an antiseptic and waterproofing mixture. From 16 to 18 pounds per cubic foot is quite sufficient. The mixture should contain at least 75 per cent of creosote made from coal tar.
- 4 Accurate manufacture
- 5 Depth and width of block different, to avoid improper laying
- 6 Enough moisture content to prevent shrinkage of blocks before laying

Long leaf pine and Southern black gum have given good results on heavily travelled streets, while short leaf pine, Norway pine, tamarack and Douglas fir are all good on medium-travel streets.

Bleeding is caused by the heat of the sun's rays softening the preservative oil and causing entrained air and moisture to expand and push some oil out of the blocks. It may be lessened by giving the wood a preliminary vacuum treatment before injecting the oil, thus keeping a certain percentage of air out of the interior of the blocks. Improper treatment at the works whereby some of the blocks get more oil than others aggravates bleeding in the street.

There used to be a clause in specifications stating that treated blocks should be as heavy as water, coupled with a stipulation that wood should be thoroughly dried before the injection of the oil. Compliance with the above resulted in an average injection of 24 pounds of oil per cubic foot and consequent excessive bleeding of the blocks on Market Street, Philadelphia.

Cresoting does not entirely waterproof wood. The cells may be full of oil while the cell's walls absorb almost none, but they will readily absorb water or give it up. Dry cell walls mean shrunken blocks. Wet cell walls mean maximum volume. It is desirable that the blocks be paved while they are full size, and to make certain of this they should be laid as soon as possible after receipt from the works, or else they should be thoroughly wetted before laying. With the smooth concrete foundation advocated, it is easy to soak them thoroughly after paving, but before the joints are filled with pitch.

Laying

Blocks should be laid 'hand tight' and not jammed closely together. There seems to be no difference in the wear to indicate any preference as to the angle which the courses of the blocks make with the gutter, but there is less waste if they are laid at right angles to it.

An expansion joint about $1\frac{3}{4}$ inches wide filled with pitch should be placed next the curb, and it is well to have the two rows of block adjacent to the curb paved parallel to it.

The joints between the blocks should be filled with a pitch or asphaltic filler. Warren Brothers Company, of Boston, controls a pouring device which does the joint filling much better than can be done by hand. It consists of a fan-sized receptacle to hold the hot pitch, is mounted on two wheels, has a "go-cart" handle, a bottom pouring outlet controlled by the workman, and has a squeegee apron attached to it which touches the pavement in a semicircle the centre of which is the pouring outlet. Where the pitch runs out it makes a little puddle of appreciable thickness. The squeegee attached to the machine causes this puddle to move along as the apparatus is drawn over the blocks. As there is quite a quantity of hot pitch in the puddle, the joints are better filled than in the ordinary method, where the pitch chills too quickly.

This filling of the joints must be most carefully done. It has a twofold purpose, namely, sealing the pavement to keep water from getting under the blocks, and providing a semi-elastic filler which takes care of the swelling and shrinkage of individual blocks. This last is very important, for there is considerable shrinkage during continued dry weather. This widens all the joints and allows the filler to sink accordingly. When the blocks absorb water after such a drying out, they swell and the pitch is pressed back again to the top of the joints. If the joints were sand or grout filled, the filler would sink when the blocks dried out, but when the blocks swelled the filler would not compress, and in time such pavement is sure to bulge and buckle.

On grades, blocks should be laid with wide joints made by inserting creosoted lath between the courses, creating a groove about $\frac{3}{4}$ inch wide to furnish foothold for horses.

* It was reported that a heavy shower of rain on the evening of the 24th April, 1916, caused the wood paving in Hasting's Street (Calcutta) to burst up from swelling of the timber. Recently, in order to prevent this occurrence, the expansion joints at the kerb were renewed and increased, but the expansion caused by the heavy rain coming on the dried timber far exceeded any possible expansion joint. The wood to suffer has been the American fir and the Indian krabark. The sal has, so far, been standing all right, but this is probably because the latter takes longer to absorb the water.—Ed

Wood block streets need very little crown—say 1 in 100—but they should be well drained. When there are street car tracks it is absolutely necessary that the rails and joints be kept rigid. If they get loose, they should be repaired at once, otherwise they will destroy the pavement.

In general, streets paved as outlined in the foregoing will give no trouble and should last for many years.

Causes of Failure

The failures may be thus summarized:

Depressions in the shoulders and ruts alongside rails are due generally to uneven thickness of bed when constructed. Ruts along the rails are caused and aggravated by loose rails jarring the blocks loose and permitting water to get under the blocks, and where a sand cushion is used this water washes the sand away. Loose rails also permit water to get under the blocks in the shoulders and cause swelling.

Swelling is generally caused by the lack of expansion joints along the curb and by the use of sand and grout filler instead of pitch or asphalt between the blocks. Swelling causes the wood to leave its foundation. If very bad it makes the blocks buckle but in many cases it is hardly perceptible, though just as serious, for when the blocks are off the foundation heavy traffic hammers them down and causes very rapid wear. The blocks get mashed and depressions develop. Also when the pavement is off its foundation the action of horses' hoofs cause a rapid wear in the joints, which results in cobbled blocks and an unsightly street and a short-lived pavement.

Blocks laid on their side cause undue wear. These do not occur very often, and by making the depth and width different should not occur at all.

Street openings have been responsible for much poor surface and buckling, as water gets in under the blocks.

There have been a few failures in this country due to an insufficient quantity of oil having been used. In Paris,

France, there have been a great many from this cause, for the blocks there have hardly been treated at all—say four or five pounds per cubic foot

There have been failures due to poor treatment at the creosoting works in cases where too green wood has been used and the sapwood has contained so much water that it got practically no injection of oil

There have been failures of black gum streets due to treating the wood after it had commenced to decay. Gum wood should be treated as soon after felling as possible and it should be artificially seasoned

From the above it will be seen that the most serious troubles have been due to the swelling of the blocks. These can all be practically prevented by pitch or asphalt joints and the elimination of sand cushions. The successful factors are the converse of what I have pointed out as the failures. I would call attention particularly to the remarkable success of wood block in Minneapolis, where they lay about 150,000 yards annually and where the city engineer does the laying with city employes —*American City*

The Housing of the Working Classes.

An example to follow

IT is still an unsettled question whether municipal house building is a legitimate charge on the rates or not. The advocates of municipal house-building have an equal number of opponents arrayed against them. On the one hand it is contended that municipal enterprise in the direction of increasing house-accommodation unfairly competes with—if it does not stifle—private enterprise. On the other hand it is pointed out that even in Western countries private capital is not readily forthcoming to provide wholesome houses for the wage-earning classes. There is also the practical argument that, so far as this Presidency is concerned, it would be financially impossible for Local Bodies—even for the richest of them—to

adequately meet the demand for house-accommodation. Whatever views may be held on the policy of municipal building, it must be allowed that it is essential for local authorities to have an efficient control over house-building and one of the most effective ways of securing this is by ownership in land. A municipal authority should own as much as possible of the open land within the limits of its authority. It will then be able to lease the land to societies of public utility or other organisations willing to observe and abide by the conditions laid down by it for the erection of houses. We have already referred to the policy of land purchase adopted by the German towns*. "The extent of land owned by German towns will probably surprise those who are unacquainted with the large views of municipal enterprise held in Germany, where large towns are as ready to spend a quarter of a million pounds in buying land as an average English town of the same size is to spend ten pounds upon a watering cart"

In Madras, there is no Town Planning Act†. It is not a congested city, it is known as the "city of distances"‡. But this does not make a Town-Planning Act unnecessary. Already, certain parts of the city—notably in Georgetown and Triplicane—are fearfully congested and there are signs of other parts of the city becoming congested if the Corporation leaves matters as they are. The recent acquisition of a large block of buildings (about 130 houses) near Adams Park must have tended to increase the congestion in other parts. The virulent form in which malaria appeared in Tondiarpet has compelled thousands to leave that district and find accommodation in other divisions of the city. In these and other similar instances, we are not aware that the Corporation took any trouble to find out how and where the dispossessed population of Adams Park neighbourhood or the malaria stricken population of Tondiarpet found accommoda-

* Vide Vol I, p 588.

† It is understood that a T P Act on the lines of the Bombay Act is under consideration by the Government of India.

‡ The municipal limits of Madras comprise 27 square miles.

tion And, in both cases, a good deal of congestion in other parts of the city must have been caused

The city requires a careful survey of all its open spaces and intelligent town-planning, before matters get out of hand and it is too late to mend except at a disproportionate cost—which will have to be paid by the general tax-payer—as in the case of Calcutta and Bombay

Fortunately for Madras, the large manufactories—an essential constituent part of every progressive city—are not in the 'heart' of the city The largest factories—there are not very many—the Buckingham and the Carnatic Mills, the Cement Works, &c, are well near the borders—and happily on the leeward side of it

Through the kindness of the Managing Agents, Messrs Binny & Co Ltd, we were able to see what is being done for the large number of operatives (about 11,000) employed in the cotton mills mentioned above

The mills form a municipality by themselves and the excellent sanitation of the mills leaves nothing to be desired and reflects great credit on the management It is indeed an object lesson to the 'municipalities' so called In addition to schools for the children of the operatives, a reading room, recreation grounds, a 'chutiam,*' bathing places, &c, already provided for, the mill agents have in hand a scheme for the provision of housing accommodation for the most deserving of their labour staff The extensive plot of land south of the mills has been purchased and the mill authorities propose to erect 22 blocks of tenements, each consisting of 8 single-room tenements The plan of the tenement appears to be more or less an imitation of that put up by the Corporation in their model settlement

A single tenement has been put up which we inspected We must confess we were not much impressed by the design The frontage and roofing could be improved Top ventilation

* A huge dining hall, divided into compartments to respect caste scruples

should be provided and is very essential for houses intended for the working classes. Windows, however generously provided, are almost always kept shut. Window openings may be made, and no shutters need be fixed. In the blocks, masonry side drains are provided both in front and rear. The drains in the front of the blocks seem to be unnecessary. It strikes us that the lay out of the land may be improved in the matter of roads and disposition of the blocks. The latrines are too prominently towards road side.

These, however, are merely matters of detail and do not detract from the value and great importance of the enterprise which we commend to all captains of industry. Messrs Binny & Co have set about in the right direction and have shown that they are fully alive to their responsibilities. Congestion is very often the result of industrial activity and the municipality cannot in such cases be reasonably expected to deal with the large problems arising therefrom by itself. Private enterprise should also help the local body and we cannot too highly commend the activities of Messrs Binny & Co in looking after the comforts of their employees. If the present housing scheme is carried out, it will mark a definite step in the solution of the congestion problem in the city.

In addition to providing amenities, the mill authorities have instituted a gratuity fund for the working people. The spirit of generosity underlying the "gratuity fund" will be apparent from the following rules, for reproducing which we make no apology.

1. The object of the Fund is to provide a gratuity that will assist or enable the Company's servants, after 10 years or more satisfactory service with the Company, to start business of their own, or to enable them to return to their country with some provision for their old age.

* It seems to us that some such scheme may, with advantage, be introduced in the scavenging staff of the Corporation, as an inducement for long and faithful service.

4 The amounts to be entered in this (*Pass*) Book shall be calculated at 5 per cent on the earnings of the operative in whose name the book is issued

5 The Company may, when the working of the mill in any half-year has been sufficiently satisfactory in their opinion to justify the same, make a special contribution or bonus to this fund in addition to the amount paid under the last preceding clause

6 As soon as the operative herein mentioned shall have served the Company for such full consecutive period of 10 years and in accordance with the rules hereunder written, the Company will pay to him the aggregate amount of the sums then entered in the account hereto annexed

8 The Company will also, in the event of the death of the operative at any period after 2 years' continuous service, pay to his nominee such sum as may be entered in such account up to the time of the death of the operative

9 After the completion of 10 years' continuous service the operative shall be at liberty on production of his book, either to draw the amount then standing to his credit or to have the same as a deposit with the Company payable on demand and bearing interest at 4 per cent per annum

10 From and after the expiration of the said 10 years, if the operative shall continue in the service of the Company, the allowance of 5 per cent on the wages of the operative shall be increased to $7\frac{1}{2}$ per cent for the purpose of providing a further bonus which shall become payable to the operative at the expiration of a further continuous service of 7 years

We invite the attention of all employers of labour to the conditions under which the Buckingham and Carnatic Mills are being worked in Madras and trust that the excellent example set by the mill managers will not be lost. We consider that the Railway Companies who are large employers of labour should be compelled to provide housing accommodation to their servants somewhat on the lines started by Messrs Binny & Co

Local Self-Government in India.

[DESPATCHES OF THE SECRETARY OF STATE FOR INDIA
ON THE PROPOSALS OF THE GOVERNMENT OF INDIA
ON MUNICIPALITIES AND RURAL BOARDS]

I—Municipalities

I have examined with interest the letter from Your Excellency's Government of the 6th March 1913, No 4-Education, and its enclosures, in which you deal with the recommendations of the Royal Commission on Decentralisation on the subject of municipalities in India. You report that, as a result of a fresh examination of the whole question, you find evidence that there has been a steady advance in the efficiency of local bodies, and that future prospects are generally hopeful, and you forward a summary of the observations of local Governments on the specific recommendation of the Commission

2 I see clearly the magnitude of the obstacles that have to be overcome before India can acquire in any great or general measure the public opinion on local affairs, and the will and ability to cope with municipal duties, that exist in western countries, but it is also true that no progress can be expected if the question is approached in too cautious a spirit. You refer to the position of Local Governments as immediately responsible for efficient administration, and propose in addressing them to indicate your assurance that it will be found possible in the more backward provinces to proceed steadily on the general lines of advance laid down by the Commission, and while maintaining all essential control to abstain from all unnecessary interference in matters of detail, and in particular to relieve officials of their municipal duties whenever possible. I agree that any attempt to exact uniformity in local administration, or to apply wholesale to existing conditions the general recommendations of the Commission, would be foredoomed to failure, and I fully concur in the view that Local

Governments must be left to decide how far the circumstances of their province admit of an advance towards the management by the people of their own affairs. I also recognise that something has been done in recent years of plenty to give full effect to the policy of freeing municipal revenues from certain charges which more properly fall on Government, *e.g.*, for Police, and I am glad to observe that Your Excellency's Government are separately considering the possibility of giving further effect to the suggestions of the Commission in paragraph 833. The principle stated in paragraph 818 of the report, on which these suggestions are based, is in my opinion sound.

3 There are however, certain large considerations that appeal to me of importance in dealing with municipal administration, and I notice in the papers forwarded with your letter indications that these may not be fully appreciated at present by some authorities.

4 Your Excellency's Government has given many pledges of an anxiety to promote, in municipal as in other areas, the development of sanitation and education as matters of Imperial concern. But the success of these great movements depends, not merely on financial grants and the provision of expert officers, but on the extent to which the people can be brought to help in furthering them, not only individually but also collectively. The existence, therefore, throughout the country of moderately efficient municipal institutions is, as it appears to me, a necessary condition of permanency in the success of your efforts. Expert control is, as remarked in paragraph 4 of your letter, necessary to efficiency in these matters, but it cannot take the place which should be occupied by interested and active municipal authorities. You refer to the fact that in the resolution of the 18th May 1882 the promotion of municipal and Local Self-Government was described as an instrument of political and popular education, and as being chiefly desirable from this point of view. It may also from one point of view be regarded as an extension of Lord Mayo's scheme

of financial decentralisation and an endeavour to provide local agencies to take charge of local services of sanitation and elementary education, and some support to the suggestions of the Commission in paragraph 837 may be found in such a line of argument. I think it desirable that the attention of Local Governments should again be drawn to the consideration that any permanent success of your efforts in the direction of sanitary and educational progress depends largely on the extent to which it is found possible to foster the vitality of municipal authorities.

5. However that may be, it was recognised in 1882 that movement was not directed primarily to immediate improvement in administration, but to the attainment of an efficiency based on intelligent co-operation of the people themselves in the sphere of public duty affecting their daily needs, and it was foreseen that failures would doubtless occur. Failures have occurred, and may still be expected, but there have also been encouraging successes, and the former should not be allowed to weigh too heavily against the need to enlist the co-operation of the people and their representatives in the improvement of sanitation and education. Such co-operation must rest on an interest in the work and a feeling of responsibility, and these in turn can only be secured by entrusting to municipalities an adequate sphere of work, adequate funds, and sufficient powers of decision in respect of both. In this connection I would suggest for your consideration, with reference to paragraphs 836 and 837 of the Commission's report and to paragraph 7 of your letter, that it may be found that earmarked grants for sanitation and education are less fruitful in the long run in fostering the growth of responsibility than Local Self-Government grants as to which the local bodies have discretion. On the other hand, the risk attending unearmarked grants can hardly be regarded as a very serious one, since the sphere of municipal work as described by the Commission in paragraph 816, is such that their expenditure must directly or indirectly promote sanitation or education,

6 I request that you will give weight to these remarks in addressing the Local Governments as to the opinions which form an enclosure to your letter under reply. I do not propose to discuss these opinions in detail, since I accept your view that the Local Governments must decide, in consultation with you, how best to foster and adequately finance municipal Self-Government within their provinces.

7 I accept your proposals on the subject of the Presidency municipalities and Rangoon, and would only remark that in such cities, where there is a responsible public Press and representation in the Provincial Councils, the case for entrusting large powers and freedom to the municipal bodies appears to be specially strong.

II—Rural Boards

I have considered in Council Your Excellency's despatch in the Education Department No 15, dated the 1st October 1914, on the subject of the recommendations of the Royal Commission on Decentralisation in connection with Rural Boards in India.

Recommendations of
the Decentralisation
Commission as to Rural
Boards,

2 The method which you propose to adopt in dealing with these recommendations follows the principle laid down by your Government, and accepted by me in dealing with the Commission's recommendations as to municipalities, *viz*, that no attempt should be made to exact uniformity in local administration, but that Local Governments should be left to decide how far the circumstances of their provinces admit of an advance. I note that the Local Governments have expressed willingness to accept to a large extent the financial recommendations of the Commission, and I agree that the measure of progress accepted by the Local Governments may be regarded as sufficient for present requirements. But while I would deprecate any attempt to bring pressure to bear on local Governments to induce them to adopt larger measures of advance than they have themselves decided upon, I regard it as

important that the Central Government should exercise watchfulness in the matter, and should be ready to help and foster every genuine sign of growth from below. In particular, I desire to associate myself with the view expressed by your Government in paragraph 4 of your circular letter of the 23rd September 1914 that the present restriction on the powers of Rural Boards with regard generally to budget expenditure and establishment should be gradually relaxed with due regard to local conditions and requirements.

3. I notice that in one respect your Government depart from the principle of not attempting to prescribe uniformity. In addressing the local Governments you have expressed the opinion that it is desirable for every District Board to have a competent engineering staff of its own, suggesting for consideration that in cases in which the finances of the Boards do not permit of the maintenance of a separate staff, a District Engineer corresponding more or less to an Executive Engineer might be placed in charge of two or more districts, and similarly that an officer corresponding more or less to a Superintending Engineer might be placed in charge of two or more divisions or other extended areas. It appears to me that the necessities of the case are adequately met by the recommendation of the Commission, which was merely that in districts where there are sufficient works falling under Rural Boards to justify the special appointment of a trained Engineer, a District Board which desires to entertain such an officer, and can afford to pay him an adequate salary should be permitted to do so. The Local Governments have, generally speaking, expressed unwillingness to make any material advance in this matter, and I see no good reason for urging them to do so, especially as the question is largely one of administrative economy, and the measure recommended by your Government may, in some instances, lead to uneconomical duplication of establishment.

The Howrah Drainage Scheme.

[BY W G MELVIN, AMICE, FSI, ENGINEER
AND ASSESSOR, HOWRAH MUNICIPALITY]

THE area of the Town of Howrah is, for the purposes of surface water drainage, divided into five sections, namely, North Foreshore, South Foreshore, Central, Shibpur and Salkia. These sections are again further subdivided into blocks, each block having its own outfall or main drain.

The North Foreshore, South Foreshore and Salkia sections lie to the east of the Grand Trunk Road and, by virtue of the slope of the ground, discharge their drainage water into the river Hooghly.

The North Foreshore Section consists of seventeen blocks, all of which are completed. Each block has a separate outfall into the river Hooghly. The cost was Rs 1,49,000.

The South Foreshore Section comprises eight blocks, also completed, except Bharapara outfall, at a cost of Rs 4,50,000. This area is very densely populated. Each block has its own outfall into the river Hooghly.

By far the largest area will be drained by the *Central Section* system of drains. This section consists of eighteen blocks, comprising town, urban and rural areas. The total area to be dealt with in this section is 2019.15 acres.

Situated as it is, to the west of the Grand Trunk Road with the land sloping inland, it is impossible to drain direct into the river in the same way as the Foreshore Sections. Therefore provision has been made for a drainage channel at the lowest level compatible with efficient flow. The land necessary for this canal has been acquired at a cost of Rs 4,00,000, which includes 425 bighas of Poddapukur jola to be used as a storage reservoir when tides are too high to admit of direct drainage into the river.

The canal will discharge into the river west of the Botanical Gardens, will be 4.62 miles long and have a bed width varying from 18'-0" to 60'-0" and an average depth of 7.00 feet

The total maximum capacity of discharge will be 725.00 c ft per second

The scheme is complete and sanctioned by Government and land acquired, but the construction of the canal and surface drains must await the provision of funds

The *Shibpur Section* is divided into four blocks, each with its own outfall towards the river. One block has already been completed at a cost of Rs 75,000 and the plans and estimates for the other three blocks are under preparation

Sulhria Section The plans and estimates for this section are under preparation. At present the amount of filtered water delivered to Howrah daily is about 2,900,000 gallons. With the exception of the Foreshore sections provided with pucca drains, most of this water, after allowing for evaporation, finds its way into the soil for want of drains to carry it off

Consequently the subsoil water level is very high. It is expected that when the surface drainage scheme is completed, the subsoil water level will be very much lower. This should greatly improve the health of the town

Co-operative House-Building in Mysore.

[By M. A. NARAYAN Aiyangar, B.A., B.L., REGISTRAR
OF CO-OPERATIVE SOCIETIES, MYSORE]

THE importance of applying Co-operation to House-Building was realized in Mysore so far back as 1909 and a society was started in December 1909 at Bangalore with a view to afford financial help to those in need of it for building purposes. The society was formed with no share

capital, the members undertaking liability to the extent of Rs 200 for the debts of the society. Seven years have elapsed since the institution came into existence. At the end of 1914-15, it had 113 members on its rolls and a working capital of Rs 19,000 raised from the Bangalore Central Co-operative Bank, Ltd, as a loan at $7\frac{1}{2}$ per cent on the reserve liability of the members. The society did business to the extent of Rs 40,860 in 1914-15, earning a net profit of Rs 405. It has built up a reserve fund of Rs 953. The institution lends money to its members, for building, repairing, or purchasing a house, the loan being secured on the house and other property of the borrowing members and being further secured by the joint-liability of one or two non-borrowing members of the society. The amount of loan is generally limited to 50 per cent of the security offered by the borrower.

Recently, a society of a more useful kind was started for the benefit of those who had purchased building sites in the Gavipuri Extension of the Bangalore City. The objects of this society are not only to lend money but, if so required, to build houses, to buy in common the materials required and to help generally to secure the best and the cheapest conditions of house-building for its members. This society has collected about Rs 295 in shares and it has further taken a loan of Rs 35,000 from the Mysore Provincial Co-operative Bank, Ltd, the whole amount being intended for the erection of about 25 houses. The society is still in its infancy but it promises to develop into a very useful institution.

There are one or two other societies likely to come into existence at an early date. These are for the benefit of the poorer classes and the constitution of the societies is likely to be somewhat different from those of the two referred to above. But the matter is still under consideration and it is premature to say how it will end.

Municipal Employees and the War.

Roll of Service

BOMBAY CORPORATION

Municipal Employees who have proceeded on active service or are working in Bombay

NAMES	DESIGNATION	REMARKS
1 Mr H Hay	Foreman, Fire Brigade	Active service
2 Atmaram Kedari	Peon	Do
3 Mr W. M. Rodgers	Assistant Motor Foreman	Do
4 " P D Palamcoat	Assistant Inspector, Streets and Buildings Surveyor do	Do
5 " G P Cable	1st Engineer, Love Grove Pumping Station, Mechanical Branch	Do
6 " E J Simpson	Sub Inspector, Health Department	Do
7 " R A McPhail	Do	Do
8 " Shavakshah C Badshaw	Correspondence Clerk	Do
9 " Dusha H Karanjis	Fitter	Do
10 " Thomas Brewin	Senior License Inspector	Embarkation duty in Bombay
11 " N N Writer	Drill Master	Proceeded to the front but having been disabled has returned
[12. " A. T. East	Senior Assistant Engineer	Active service Died of wounds.]

CALCUTTA CORPORATION

NAMES	DESIGNATION
(1) Mr A Neill	Asst Reporter of the Corporation
(2) Capt. Henderson	Superintendent, Sir Stuart Hogg Market
(3) Sergeant Ballan	Sergeant, Sir Stuart Hogg Market
(4) Babu Tapasindhu Chatterjee	Collecting Sircar, Sir Stuart Hogg Market

MADRAS CORPORATION

NAMES	DESIGNATION
1 Captain E C Hodgson, I M S, D F M & D T M H (Camb)	Special Malaria Officer
2. Mr. D W. Houghton	Asst. Arborist

3 Mr G W Smith	Tar Fitter, Workshops
4 Mr B Jones	Driver, DeMellows Road Station
5 Mr G T Lazaro	Fireman, Kilpauk

The following are carrying out military duties in Fort St George thus relieving experienced soldiers for active service

- 1 J W Maddley, Captain, M V G
- 2 J R Coats, Lieutenant, M V G
- 3 H L Houston, Lieutenant, M V G
- 4 H W Barker, Second Lieutenant, M V G

RANGOON MUNICIPALITY

NAMES	DESIGNATION
1 Mr L F Kenny (Reservist)	Sanitary Inspector
2 „ A E Mann	Assistant Engineer
3 „ L E Gilbert	Inspector, Glanders and Faroy
4 „ O McKenzie	Third Officer, Fire Brigade
5 „ D Shicore	Clerk, Assessor's Office
6 „ J O'Brien	Sub Inspector, Water and Sewage Department
7 Dr J B Stephens	Health Officer
8 Mr A J Parsons	Registrar, Registered Buildings
9 „ R H Boudville	Clerk, Assessor's Office

Public Health and Sanitation.

Model Lectures on Sanitary Subjects

*Step-wells and Guineaworm disease of Naru **

IN the Ceded districts of the Madras Presidency every village has a step-well and numbers of people in these villages suffer or have suffered from naru or guineaworm disease. Now, why do I mention these two things together? Is there any connection between them do you think?

Yes, there is. For we may safely say, 'If there were no step-wells or tanks in the country, there would be no naru.' Now, how is this? Listen and I will tell you the wonderful story of the guineaworm, and when you have heard it, you will agree that it is as wonderful as any of the fairy stories you have heard from your mother, or the legends of St Thomas Munio that the wandering minstrel sings in your streets.

* This model Lecture, submitted by the Surgeon-General, has been approved by Government and ordered to be communicated to all local bodies.

You have all seen people suffering from naru, and you know how they have sores near their ankles or in other parts of their bodies, and that they suffer from fever because of this. You also know that it takes a long time for the people to recover from it, and that sometimes the people never quite recover but go about with stiff joints because of this evil naru. These people become beggars for they can no longer work because their joints are stiff.

Now, if you were to ask a man suffering from naru to show you his leg, you would find a small ulcer or sore near his ankle. Look in the centre of the sore and you will see a white thing, which is really the body of the naru. Now, if you put a drop of water on this sore, what would happen? Does the water remain clear and bright as when it came from the well? No. Watch carefully and you will see that the drop of water becomes milky. Why is this? If your eyes had the power to see very small things you would understand the reason. Out of the naru, hundreds of very small baby worms have floated into the water and made it milky, just as would happen if you mixed chunam with the water. But you may ask, "how do you know that the milky appearance is caused by these small worms?"

Well, if you ask the doctor at the hospital he will perhaps put a drop of the milky water under his microscope which is an instrument that makes things look very big. If he is a kind doctor he will let you look through his microscope, and then you will see a wonderful sight. You will see hundreds of small worms wriggling about in the water and moving every way. Now, these are young narus. But where have they come from? They have come out of the body of the naru that you saw in the sore. For the naru you saw at the bottom of the sore was a mother naru, and she had in her body about 30-lakhs (30,00,000) of these small worms. When you put the cold water on the sore she knew that it was time to put out some of her many babies so that they might begin to live for themselves. So she squinted some hundreds out into

the water, and made it milky as you saw. Now, that is a wonderful story, is it not? But there is a more wonderful story to follow, so listen carefully.

You will remember I told you that it was the feeling of the cold water that made the mother worm squirt out the baby worms into the water. Well, when a man or woman with a naru sore on the leg goes down into the water of a step-well, or tank exactly the same thing happens. The mother naru feels the nice cool water of the well and squirts out hundreds of her baby narus into the well water. Now, what happens? The person who has been the means of sowing hundreds of narus in the well, goes away not knowing what he has done. The young naru babies would very soon die in the water if left alone. But in the water of the well lives another small creature called a cyclops or water-flea, so small that you require good eyes to see it, for it is only about the size of small pin head. Though it is so small, it is very large compared with the little white naru worms that came out of the person's leg. So the water-flea swallows some of the baby narus thinking they are good for food. But these baby narus are not killed by being swallowed by the water-flea. They have sharp ends like thorns, and they wriggle through the stomach of the water-flea and live and grow in its body. After growing for some time in the body of the water-flea the baby naru is ready to grow into a mother naru like the one you saw in the man's leg. But how does it get into the man's leg? Listen and I will tell you.

You mother goes to the well in the morning and fills her water-pot and brings it home for you and father to drink. In the water are some of the water-fleas, and they are so small that you do not notice them, so you drink some along with the water! You do not know that you have swallowed the water-fleas and that the water-fleas have baby narus in them. Now, what happens in your stomach? The water-flea dies at once, but not so the naru inside it. It becomes very lively and bores its way out through the skin of the water-flea.

It then wiggles to the side of the stomach and bores its way through your stomach and so gets into your body itself. It is so small that you do not feel any pain, and it grows so slowly that you do not know anything until about a year afterwards the naru has become full grown and gives you fever and then makes the ulcer on your ankle, and you find you have a sore like the man you saw with the naru in his leg. Now, why does the naru make the sore? It is because it has now got a lot of tiny baby narus in it and wants to let them out into the water of a well. And that is the reason it makes the sore near the foot, because it knows somehow or other, that the foot is the part that goes oftenest into the well. The naru is now full grown and is about three feet long, and if you ask the doctor he will tell you how difficult it is to draw it out and how sore the foot often becomes while this is being done. Now how can we prevent the young narus getting into your stomach?

There are two ways of doing this. First, you may prevent people with the naru sores going into your drinking water. You can do this by building a high wall round the step-wells so that no one can walk into the water. You thus make the step-well into a draw-well, so that people can only draw the water by buckets on a rope and cannot reach it with their feet. In this way no baby narus can reach the water, and the water-fleas in it do not become full of the small worms that can infect you when you drink them.

The second way of preventing the baby narus from getting into your stomach is by straining the water through a fine cloth. The water will go through but not the water-fleas, and you can then drink the water safely.

These seem very simple things to do, and everybody can do them. If you want to escape from having naru sores you must do one or both of them.

You can also of course boil the water before drinking it so as to kill the water-fleas and narus. This also will make the water quite safe to drink.

Fumigation with burning Neem Leaves as a Plague disinfectant

An efficient plague disinfectant would be one that breaks the chain of infection by the plague bacillus, through the rat and the rat-flea to man

Large sums of money have been spent on rat-killers, but it is acknowledged now that efforts in this direction have proved almost futile

Finding I was frequently asked by Europeans and Indians alike in this District (Saran) for a simple house disinfectant, I began a series of experiments in January 1912 with substances that would be likely to kill off rats in plague-infected houses. I sought a substance that could be so applied that it would search out all lurking places of rats and kill them. The method of fumigation suggested itself to me at once. I experimented in my servants' godowns as follows. Rats in traps were suspended from the roofs, placed on the ground, under bundles of clothes, etc., in a godown. Thirty to fifty cow-dung cakes or *chapathies* (easily obtained of course in every village) were arranged in a loose circle in the centre of the cleared floor of a hut and set on fire, with or without the aid of a little kerosine oil. The various substances to be experimented with were piled on the burning cow-dung *chapathies* when well alight, the doors and windows were shut, and the fire was allowed to burn itself out. In this way rats were subjected to the fumes of innumerable burning substances in turn, but although hundreds of experiments were performed, the rats (though occasionally showing signs of distress) survived as a general rule.

In the course of examining some rats after the experiments, I noticed some dead fleas on some that had been fumigated with neem leaves. I repeated the experiments with neem leaves, but surrounded the rat-traps, except on top, with muslin. I then found that in practically every case the

* From a Report by Major T. H. Delany, I. M. S.

rats were found to be free from fleas, but the muslin under the traps contained a number of dead fleas. Some further experiments showed that the longer the rats were exposed to the neem fumes the greater the number of dead fleas that were found. The best results were obtained by an exposure of over two hours, and up to three hours.

I now experimented with a large number of other substances, but failed to discover any better pulicide than the fumes of fresh neem leaves. I tried in turn naphthalin, native tobacco, "khami", pyrethrum flores, sulphur, incense, as well as the leaves of the castor oil plant, the banyan tree, bamboo, various grasses, snash, pulses, pipul, oleander, and many others, burnt with a fire made of cow-dung *chapathies*, but none of the substances tested acted as pulicides, nor did any of these substances burnt with neem leaves, give as good results as neem leaves alone.

I have also endeavoured by various experiments to improve the method of fumigation by neem leaves, but failed. I am not satisfied that neem leaf fumigation will kill all the fleas on every rat; a few fleas do occasionally survive at times. This may be due to imperfections in the method of carrying out the experiments, either the muslin had been wrapped too much around the trap, and so protected the rat to some extent from the fumes, or the fires had gone out too soon, or the fleas at times may be better able to obtain protection from the fur of some rats, than in that of others. It seems more than likely, however, that fleas that had dropped off the bodies of dead plague rats, viz., real plague fleas, or plague infected fleas, would be killed with greater ease in exposed positions on floors, and on walls, than they are when buried in the furry coat of the rat.

Lastly, I find that some kinds of fleas are killed more easily than others. I will endeavour to ascertain whether, as I suspect, the true rat flea or plague flea is more easily killed than the other kinds of fleas infesting rats. Believing, then, that this is the best method of breaking the chain of infection

from rat to man, I had instructions printed in pamphlet form, and had them distributed in thousands all over the district, by the plague staff last plague season. People of all classes took to the method immediately. It costs little or nothing, and the materials are available in every village in the Province. It is not necessary to dry the neem leaves, they can be used and, in fact, are most effective, when taken direct from the tree and burnt. They give off a dense penetrating smoke. I believe there are great possibilities in this simple inexpensive method of disinfection for plague, which I consider to be the most practicable that is available at present.

Water Supply.

Dacca Water Supply Scheme

THE scheme submitted by the Dacca Municipality for improving the water supply has been approved by the Government. The particulars of the scheme are as follows —

(a) The scheme consists of erecting two elevated reservoirs (to be built with reinforced concrete, the capacity of one would be 120,000 gallons, and that of the other 80,000 gallons, these will virtually serve as balancing tanks, through a 15-inch diameter gravitation main, connected with one, and through a 6-inch gravitation main connected with the other, the bigger reservoir will be erected in the Victoria Park, and the smaller one near the suspension bridge), making additions and alterations to the existing distribution system, providing an additional 15 feet diameter Jewell gravity filter to the existing battery of five similar filters, laying an additional line of suction main 2,200 feet long 16 inches in diameter, and erecting a screw-pile river intake jetty over 300 feet long.

(b) The estimated cost of the scheme is Rs 1,80,000

(c) The estimated cost of maintenance is Rs 3,500

(d) The sum of Rs 1,80,000 on account of the cost of the scheme will be met as follows —

	Rs
Loan from Government	1,75,000
Contribution from General Municipal Fund	5,000
Total	<u>1,80,000</u>

The annual charge of Rs 3,500 on account of maintenance will be met from the water-rate, and that of Rs 12,794 on account of the repayment of the loan of Rs 1,75,000 will be met from the water-rate and the General Fund

(e) A loan of Rs 1,75,000, bearing interest at 4 per cent per annum, will be taken by the Municipality from Government to meet the cost of the scheme. It will be repaid by forty half yearly instalments of Rs 6,397 each, twenty years will be required to repay it

(f) The total annual charge on account of the maintenance of the scheme is estimated at Rs 3,500, and that on account of the repayment of the loan of Rs 1,75,000 is Rs 12,794. The former will be met from the proceeds from the water-rate, and the latter will be met from the General Fund and the proceeds from the water-rate

(g) The water-rate will be levied as heretofore at the rate of 2 per cent on the annual value of holdings having no communication pipe and at the rate of 5 per cent on the annual value of holdings having communication pipe

(h) The average incidence of the water rate per head of present population of the Municipality is Re 0-8-5

Nator Water Supply Scheme

The scheme submitted by the Commissioners of the Nator Municipality for providing a water-supply to that Municipality has been approved by the Governor in Council. The particulars of the scheme are as follows —

(a) The scheme is to provide the people of the town of Nator with filtered-water by means of pipes. A plot of land measuring 20 acres will be taken in Hazri, Nator, where a large tank will be excavated and the filter installation, etc., will be constructed there. The water after being filtered will go to an overhead tank from which it will be distributed to the people of Nator through pipes and hydrants. The hydrants will be placed at intervals

For the present the pipes will pass from the tank via Domepara Upper Bazaar, Garikhana Sukulpatti, Maidapatti, Kapuripatti, Goldarpatti to civil station and from the Kapuripatti Thimohini via

Palkhana Lalbazar to the Laldighi diuin on the east of Joykahi's temple. The area of the tank will be large enough to meet the requirements when the pipes will be extended to other parts of the Municipality. The total population of the Municipality is 8,251, of whom 5,000 will be benefited from the present scheme.

(b) The estimated cost of the scheme is Rs 67,700

(c) The estimated cost of maintenance is Rs 1,000

(d) The sum of Rs 67,700 on account of the cost of the scheme will be met as follows —

	Rs
Contribution from Government	30,000
Loan from Government	10,000
Private subscriptions	27,700
Total	67,700

The annual charge of Rs 1,700 on account of maintenance will be met from the water-rate, and that of Rs 736 on account of the repayment of the loan of Rs 10,000 will be met from the General Fund.

(e) A loan of Rs 10,000, bearing interest at $\frac{1}{2}$ per cent per annum, will be taken by the Municipality from Government to meet the cost of the scheme. It will be repaid by twenty yearly instalments of Rs 736 each, twenty years will be required to repay it.

(f) The total annual charge on account of the maintenance of the scheme is estimated at Rs 1,000, and that on account of the repayment of the loan of Rs. 10,000 is Rs 736. The former will be met from the proceeds from the water-rate, and the latter will be met from the General Fund.

(g) The water-rate will be levied at the rate of 3 per cent on the annual value of holdings situated in roads supplied with water and at the rate of 2 per cent on the annual value of holdings situated in roads not so supplied.

(h) The average incidence of the water-rate per head of present population of the Municipality will be Re 0-3-3

Government Orders and Notifications.

[Bombay]

Power of Appointment of District Municipalities

UNDER section 46 of the Bombay District Municipal Act, 1901 all appointments made or allowances granted by a municipality require the sanction either of Government or of the Commissioner. The Governor in Council is now pleased to decide that the Act should be amended so as to enable district municipalities to create appointments or to grant allowances involving a charge on municipal funds not exceeding Rs 50 a month in each case, without sanction, subject, however, to the condition that the Commissioner may withdraw this power from any municipality when in his opinion there are good reasons for doing so.

2 The Remembrancer of Legal Affairs should be requested to submit to Government a draft of an amendment to the Act to give effect to this decision [G O No 2761, dated 17-4-1916]

[Bengal]

Public Works Cess and Rural Water Supply

I am directed to refer to Government Order No 980 T—M, dated the 3rd November, 1913, addressed to the Accountant-General, Bengal, a copy of which was forwarded to you with memorandum Nos 981-85 T—M, dated the 3rd November, 1913. It was intimated in this letter that the Public Works Cess for the year 1913-14 should be given to District Boards unconditionally but that the question whether conditions would be imposed in future years or not was under the consideration of Government. Subsequently in Mr Samman's letter Nos 388-92 M, dated the 7th February, 1914, to your address, it was stated that His Excellency in Council desired to impress upon the District Boards the importance of setting apart a substantial sum out of the income enhanced by the surrender of the Public Works Cess for the sanitation of villages and small towns, for the improvement of water-supply and for anti-malarial operations.

2 It has been the consistent policy of Government to reserve to themselves the powers of earmarking a portion of the Public Works Cess for the improvement of the water-supply and similar objects. Accordingly in the Bill which was drafted to amend the Bengal Cess Act in order to give legal effect to the localization of the Public Works Cess, Government reserved to themselves the power of making rules to prescribe the objects on which this cess should be spent and the

manner and proportion in which this expenditure should be distributed. The amendment of the Cess Act has, however, been held in abeyance pending the consideration of the recommendations of the District Administration Committee. In the meantime the Governor in Council desires to draw the attention of District Boards to the recommendation of that Committee for the utilization of the Public Works Cess in financing unions under the Local Self-Government Act, and to warn them against any increase in establishment or other recurring expenditure which may absorb a large part of the additional income.

3 With regard to the expenditure of the current year, in view of the distress in rural areas caused by heavy floods and the decline in the price of jute, the Governor in Council desires to impress upon all District Boards the desirability of spending large sums of money in the excavation of tanks in rural areas. The comparative cheapness of labour should make it possible for a much-needed improvement in this respect to be effected at a minimum of cost, while under systematic control such works should go far to relieve local distress by affording employment for the labouring classes in want. With this object, attention should be paid to the employment as far as possible of local rather than imported labour. Wherever the condition of the locality requires, the rule insisting on the contribution of a third of the cost of works on water-supply should be relaxed. In the opinion of His Excellency, this enterprise will afford suitable opportunity to District Boards for the proper utilization of their surplus balances and the additional resources placed at their disposal.

4 I am accordingly to request that the attention of the District Boards in your Division may be drawn to this important matter at an early date. [Circular No 2931-23 L S G, dated 25-9-15 to Commissioners.]

Legislative Intelligence.

[Parliament.]

REDUCTION of Infant Mortality.—Mr. King, in the House of Commons asked the President of the Local Government Board whether the recent returns showed an increase or diminution of the percentage of infant mortality, and what steps were being taken in this connection?

Mr. Long replied —The latest figures for 1915 show that the death-rate under one year of age amounted to 110 per 1,000 births, as compared with 115 per 1,000 births in the previous ten years, and 105 in the year 1914 and 108 in the year 1913. In spite of the general restriction of local expenditure, active steps are being taken by practically all the larger local sanitary authorities to lessen infant mortality and to promote the welfare of infants generally. My Department have distributed a grant of about £41,000 in aid of maternity and child welfare work during the financial year which has just ended.

[Imperial Legislative Council]

FINANCIAL AUTHORITY OF SANITARY BOARDS —The Hon'ble Maharajah Ranajit Sinha of Nashipur asked if any Provincial Sanitary Board has been entrusted with financial authority and responsibility.

The Hon'ble Sir C. Sankaran Nair replied —

So far as information at the disposal of the Government of India shows, Sanitary Boards in certain provinces have been entrusted with financial authority and responsibility. For example, in Bombay, the United Provinces and Punjab, certain sums are placed by the Local Government every year at the disposal of Sanitary Boards for distribution.

[Punjab]

EXTENSION OF PRIMARY SCHOOLS —The Hon'ble Lala Kashi Ram called the attention of Government to the question asked by the Hon'ble Mr. Surendra Nath Banerji at the meeting of the Imperial Legislative Council with reference to the quinquennial programme of the expansion of primary schools and asked if the Government had drawn up similar programme of expansion for the ensuing triennial period for the Punjab?

Government replied —

In 1911 a scheme for the extension of primary education in the province during the five years ending in 1917 was prepared at the request of the Government of India. The

scheme gave a rough estimate of the number of primary schools for boys which could be opened in the period, if grants were sanctioned for the purpose from imperial revenues. It was proposed to raise the number of such schools from 3,217 to about 6,000, with proportionate additions to the training institutions and the inspecting staff, besides strengthening the teaching staff of the existing schools and raising teachers' salaries. Details were given of the expenditure which would be involved, and it was estimated that the recurring grant from imperial revenues, which would be required if the scheme were to come into force, would amount to nearly ten lakhs by the close of the period.

In 1913 a second set of estimates was asked for and supplied, covering all educational requirements, including the expansion of elementary education, for three years ending in 1915-16. Both schemes were merely hypothetical programmes, intended to show how funds, if provided on a sufficiently liberal scale, could be utilised on educational objects in the province.

RIGHT OF ELECTION IN MUNICIPALITIES.—The Hon'ble Lala Kashi Ram asked in how many municipal committees the right of election was taken away since 1890 and for what connect and in how many municipal committees the number of members reduced since that year and for what reasons, and whether any opportunity had been given to the municipal committees concerned in each case to show cause against the order before the order of Government was passed against them?

Government replied —

Since 1890 the right of election has been withdrawn in the case of the following nine municipalities —Hissar, Bhilwari, Ballabgarh, Shahabad, Simla, Dinanagar, Sahiwal, Hazro and Pakpattan. In the case of Simla the change was made for special administrative reasons as explained in the answer given to the Hon'ble Rai Bahadur Shadi Lal at the meeting of this Council held on 19th September 1913. In the case of

all the other municipalities with the possible exception of Shahabad, the right of election was taken away because of continued maladministration due either to religious animosities and faction feelings or to the misconduct of the elected members. The right has recently been restored in the case of Hissar. It may be added that in four of the cases in which the withdrawal of the right was due to misconduct, the change had the support of the residents in the town.

During the period the number of elected members has been reduced in 9 municipalities. In the case of Palwal the reduction is of a casual and probably temporary nature. In the cases of Karnal, Panipat and Multan the members were reduced in the hope of expediting the disposal of business, in the remaining cases the change was brought about owing to the lack of suitable candidates or the continued indifference of elected members to their duties.

The answer to the second part of the question is in the negative. The orders of Government in administrative matters of this nature are, as the Hon'ble Member must be aware, not passed without full consideration of all aspects of the case.

EMPLOYMENT OF FEMALE SANITARY INSPECTORS—The Hon'ble Rai Bahadur Rai Saram Das asked how many Municipalities and District Boards in the Punjab employ female Sanitary Inspectors and midwives who went about in the areas under their charge, offering advice and help to women folk in the prevention of infantile mortality?

Government replied as follows —A Lady Health Visitor is employed by the Lahore Municipality.

Midwives are employed by 30 municipalities and 9 district boards.

The introduction of Women Sanitary Inspectors into the cities of the Punjab would no doubt be a useful measure, but a practical difficulty which forms a bar is the paucity of educated women available for medical training. On account

of the meagre supply of trained women there are at present several posts unfilled in the Medical Department, but ways and means are being considered by which a larger number of Indian women may be induced to enter the medical and sanitary professions. Endeavours are also being made to increase the number of midwives working under municipalities and district boards. Special courses of instruction for the improvement of those already so working will be held during the course of the coming summer.

District boards and municipalities have been asked to support a scheme to provide more of these women trained on lines which it is considered will increase their usefulness. There is here, however, a large field for private generosity, and if Indian gentlemen who understand the benefits of sanitation in the home and the necessity for the skilled care of children, would come forward and endow stipends for the training of Indian women in such matters Government would welcome their co-operation in this matter. Until properly qualified women in sufficient numbers are available, Government does not consider it advisable to make any further suggestions to local bodies regarding their employment in connection with infantile mortality.

MEDICAL RELIEF IN RURAL AREAS—The Hon'ble Sardar Gajjan Singh asked if the Government were aware that the number of dispensaries for medical relief in the rural areas of the Punjab was too small to meet the requirements of the people and whether the Government would take steps to increase the number of such dispensaries?

The Hon'ble Mr. Clark replied—(a) Government is well aware that the number of dispensaries in the Province is not sufficient to meet the growing demand for organised medical relief, and special attention was drawn to this fact in the review of the Local Government on the Annual Report on the working of charitable dispensaries in the Punjab for 1914 in which it was pointed out that the number was inadequate

in many districts, *viz*, Kainal, Ambala, Ludhiana, Kangra, Jhelum, Sialkot, Rawalpindi, Attock, Mianwali and Montgomery. At the same time it should be stated that progress, though slow, is continuous, as in the past twenty years the number of local fund dispensaries has risen from 228 in 1895 to 269 in 1915. In addition an itinerating dispensary has been started in each of the districts of Hissar, Kainal, Lyallpur, Hoshiarpur and Montgomery, while two such dispensaries are in existence in the Multan District.

(b) The question of increasing the number of dispensaries is engaging the attention of the Inspector-General of Civil Hospitals who has been requested by Government to go into the question with the local authorities concerned. On the advice of Government 27 out of 71 Canal Dispensaries in the Province have been thrown open to the general public, the local bodies contributing towards the cost. A good many of these are doing excellent work, and it is hoped that as this becomes more freely recognized local bodies will take greater advantage of this form of assistance.

Recent Publications.

PRINCIPLES AND METHODS OF MUNICIPAL ADMINISTRATION By William Bennett Munro, Professor of Municipal Government, Harvard University

THE NEW PUBLIC HEALTH By Hibbert Winslow Hill, M.B., M.D., D.P.H., Director, Institute of Public Health, M.O.H. of London, Canada

THE CHIVALRY HEALTH The South Social Cong., Houston, Tex. Edited by James E. McCulloch

[The volume contains papers on "the cost of preventable diseases," "some causes of ill-health," "the health of children," etc.]

OCCUPATIONS FROM THE SOCIAL, HYGIENIC AND MEDICAL POINTS OF VIEW By Sir Thomas Oliver, M.D. Cambridge Public Health Series. Cambridge University Press. Price 6s net

ELEMENTS OF HIGHWAY ENGINEERING By Arthur H Blanchard, C E , A M , with photographs, charts and diagrams

TOWN-PLANNING IN ANCIENT TIMES By F J Haverfield
Oxford University Press

GARDENS IN TOWNS Being a statement of the law relating to the acquisition and maintenance of land for purposes of recreation By Sir Robert Hunter, K C B , Esq and Spottiswoode Price 6s net

CITY PLANNING, with special reference to the planning of streets and lots With illustrations By C M Robinson

CITY PLANNING Edited by John Nolen Appleton
Price \$2

LANDSCAPE GARDENING AS APPLIED TO HOME DECORATION By Samuel T Maynard Second edition, re-written and enlarged

THE RELATION OF SCULPTURE TO ARCHITECTURE By T P Bennett Cambridge University Press Price 15s net

HYDRAULIC FLOW A book of reference of standard experiments on pipes, channels, notches, weirs and circular orifices, together with new formulæ relating thereto By A N Baines Price 12s 6d net

THE STRUCTURE AND PROPERTIES OF THE MORE COMMON MATERIALS OF CONSTRUCTION By G B Upton Chapman and Hall Price 10s 6d net

AMERICAN SEWERAGE PRACTICE—Vol III, Disposal of Sewerage By Leonard Melcalf and Harrison P Eddy New York

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CITY PLANNING

Call (Louis) Benefits derived by an urban district adopting a town-planning scheme (Building News, December 29, 1915 Architect and Contract Reporter, December 24, 1915)

Hammond (George T) The problem of city beautification
as observed in Europe (Albany, 1915)

Taft (William H) Importance of city planning
(Pacific Municipalities, December 1915)

Wallis (Rolland S) The arrangement of city streets
(Iowa Engi, Jan 1916)

CIVIC EDUCATION

Fitzpatrick (Edward A) What is Civic Education?
(National Municipal Review, April 1916)

Co-OPERATION

Ewbank (R B) The Co-operative movement in India
(Contemporary Review, April 1916)

GOVERNMENT

Fitzman (Julius) The Administration of European
cities (Journ Assoc Enging Societies, Dec 1915)

[Review of forms of Municipal Government in Germany, England,
Canada and the U S]

HOUSING

Lindemann (Hugo) Die Entwicklung unserer Woh-
nungsverhältnisse, (Kommunale Praxis, Oct 9,
1915)

[A comparison of housing conditions in 48 German cities in the years 1913
and 1914]

LIQUOR TRAFFIC

Robeles (John H) Municipal Prohibition in Quebec
(Canad Mun Journ January 1916)

MILK SUPPLY

Sturgis (Russell) The rôle of dairy inspection in safe-
guarding a city's milk supply 1915, New York City
Health Dep Reprint Ser No 30

PROPAGATION OF DISEASE

Offord (J) The knowledge of the ancients regarding
the propagation of disease by flies and mosquitoes
(Science Progress No 40 April 1916)

Notes.

RAJAPUR MUNICIPALITY — The following notification has been published in the *Bombay Government Gazette* —

Whereas it appears to the Governor in Council that the period of four years, ten months and twenty-eight days for which the Municipality of Rajapur was superseded by Government Notifications in the General Department No 2700, dated the 4th May 1911, No 3902, dated the 18th May 1914, No 3506, dated the 28th April 1915, and No 8269, dated the 25th October 1915, is insufficient for the purpose of rectifying the effects of the incompetence and default of the said Municipality, now in exercise of the power conferred by section 179, sub-section (3), of the Bombay District Municipal Act, 1901 (Bombay III of 1901), the Governor in Council is pleased to continue the said period of supersession until the 30th June 1916

COSSIPORE-CHITPORE MUNICIPALITY — The following resolution was unanimously passed by the Municipality at a recent Special General Meeting convened to consider a reference from Government —

(a) That a report be submitted to the Magistrate, 24-Parganas informing him that the Commissioners of the Cossipore-Chitpore Municipality wished to retain the option of electing an official Chairman, and (b) that the Commissioners did not think that professional gentlemen whose services were retained by Government such as Government Pleaders should be classed as officials

THE CALCUTTA CORPORATION — Government have appointed a second Municipal Magistrate to hear municipal cases with jurisdiction over the whole of Calcutta. It is hoped that the appointment would result in a more speedy disposal of cases

THE CALCUTTA MUNICIPAL ACT AMENDMENT — In view of the time that is likely to be taken up at various stages of the Calcutta Municipal Act Amending Bill, Government are reconsidering the proposals to take up separately the 'amendment of the Food and Drugs sections of the Act

THE BOMBAY CORPORATION — At a special meeting of the Corporation, the Hon'ble Mr D E Wacha was unanimously

re-elected to represent the Corporation in the Bombay Legislative Council

The following resolution was carried unanimously and by acclamation —In parting with Mr P R Cadell, CIE, ICS, the Corporation once more desire to place on record their high appreciation of the very valuable services rendered by him to the city in his capacity as Municipal Commissioner during the past 6 years, of the conspicuous ability he has displayed in dealing with all the varied and different questions connected with the municipal administration of the city and of the great zeal, promptitude and efficiency with which he has initiated, elaborated and carried out very important measures for the development of the city and for the improvement of its sanitation

At its meeting held on the 2nd May, the Corporation resolved to re-appoint Mr H J Trivess Smith, Hydraulic Engineer for a further period of five years from June 1916 on a salary of Rs 1,800 per mensem. Mr Trivess Smith is known to be a capable officer, and the successful completion of the duplication of the Tansa Main was largely due to his unwearied supervision and well-devised arrangements

SANITARY GRANTS (UNITED PROVINCES) —In G O No 202/X 40, dated the 17th January 1916, the Sanitary Board was informed of the distribution of the allotment of 5 lakhs for sanitary purposes during 1916-17. The allotments made by Government out of the above grant aggregate Rs 1,45,800 as follows —

	Rs
Free distribution of quinine	20,000
For expenditure on Enquiry into the cause of malaria	11,000
Improvement of the pilgrim route to Garhwal	5,500
Pay of establishment entertained for 2 Dy Sanitary Commissioners	8,300
Pay of Secretary, S Board, and cost of establishment	11,500
Rural sanitation	50,000

Travelling allowances of non-official Members of Provincial and Divisional Malaria Committees *	Rs 3,500
For outbreaks of Cholera	15,000
For village sanitation through panchayats ..	6,000
Contribution to Mussoorie Municipality for Hydro-electric scheme ..	15,000
	<hr/>
TOTAL Rs	1,45,800

The balance, Rs 3,54,200, is the amount at the disposal of the Sanitary Board. In addition to meeting certain recurring grants already promised by the Board out of this balance, grants towards the preparation of a general Drainage Scheme for Bareilly (Rs 12,000) and towards the drainage works of Almora (Rs 25,000) have been earmarked.

CHITALDRUG DISTRICT BOARD (MYSORE) —The District Board of Chitaldrug has agreed to the adoption of the metric gauge for the Chikjajur-Chitaldrug Railway, and has resolved to take steps to raise the necessary loan.

The Board has expressed its willingness to pay half the cost of the purchasing and maintaining two breeding bulls in the District Veterinary Hospital one of a milching strain and the other of a draught strain.

THE BANGALORE CITY MUNICIPALITY —The following telegram was despatched to the Private Secretary to His Highness the Maharajah of Mysore —

“The City Municipal Council, in meeting assembled, present their humble respects and, on behalf of the citizens, tender their loyal and respectful congratulations to His Highness the Maharaja on having secured for the people of Mysore the inestimable boons of storing the waters of the Cauvery for irrigation and of establishing a separate University for Mysore.”

BANGALORE CITY IMPROVEMENTS —The Mysore Government have approved a scheme, estimated to cost Rs 74,000, for improving the Palace Upparahalli and Dobbspet and

* These Committees have since been abolished.

offered to contribute one-half of the outlay from State funds, if the Bangalore City Municipal Council find the other half from their funds. The President has been requested to submit detailed estimates together with proposals for meeting a moiety of the outlay from municipal funds. The main features of the proposed improvements are —

(1) The setting back of the two villages so as to keep them 100 feet removed from the main roads, the open margin thus left being planted with trees

(2) Laying out regular streets, roads and conservancy lanes

(3) Providing a sewage system

(4) Removing congestion by expanding the two villages, for which purpose adjoining agricultural land is proposed to be acquired

(5) Providing a special block on the west of the 5th main road for Palace servants

NEW SANITARY WORKS — The Government have sanctioned the (Naiipui) Rawalpindi Pan Area Water-supply Scheme at an estimated cost of Rs. 25,275 and the Rewari Water-supply Scheme at an estimated cost of Rs. 2,83,877. Sanction has also been accorded to the Multan Drainage Scheme, estimated to cost Rs. 3,82,992.

The Khushab Water-supply Scheme has been approved by the Sanitary Board and recommended to Government for administrative sanction. The Sanitary Board considering the scheme an urgent one, decided to sanction a grant-in-aid of Rs. 92,569 as the amount of loan applied for has been refused by Government, conditionally on (1) the remainder of the estimated cost being provided locally, and (2) it being within the competence of the Board to transfer the grant-in-aid of Rs. 45,520 placed at the disposal of the Isa Khel Municipality for the water works scheme, which has been abandoned on account of change of headquarters, to the Khushab Water-supply Scheme.

INSPECTION OF PUMPS AND MACHINERY — The Lieutenant-Governor of the Punjab has directed that in all cases where expensive installation of pumps and machinery have been or shall be provided, the local body responsible for the upkeep shall have them regularly inspected every year.

The Local Self-Government Gazette.

Vol II, No 6]

JUNE

[1916

Housing and Town Planning

IN two issues of the *Local Self-Government Gazette* for 1915, we drew prominent attention to the first annual report of the Massachusetts Homestead Commission and summed up briefly the main lines of policy advocated by the Commission for dealing with the question of preventing the haphazard growth of towns and providing wholesome homes to people of moderate means. We also examined how far the remedies suggested were applicable to conditions in this Presidency. These articles evoked considerable interest in this Presidency and elsewhere, and the Bombay Co-operative Housing Association republished the first of them in pamphlet form. We have now received the second Report of the Homestead Commission and trust that a review thereof with special reference to local conditions, will be found useful by municipal councils, local bodies and private gentlemen interested in town-planning and building problems. We need not add that our aim is not to offer a detailed review of the report but to dwell on points that are of educative value to us at the present time.

Our readers will remember that a very important section of the first report was devoted to an account of the work done by the Governments of various countries in the world in aid of the housing of the working people. This study established the outstanding facts 'that the idea that private initiative and enterprise will furnish a sufficient supply of wholesome homes for the people has been abandoned in all progressive countries' and that "loans, credits, land favours

and special favours by taxation or exemption from taxation" are allowed in most countries to enterprises which have for then object the provision of such homes. In Massachusetts, however, it was found that, under the constitution, the Commonwealth could not lend direct aid to such schemes. The Commission had therefore to formulate recommendations which would 'indirectly improve conditions in and about such homes'.

The first and most prominent of these recommendations was that each city and town with a population of 10,000 should be directed to establish a local planning board whose duty it shall be to originate schemes for dealing with congested areas, forecast the requirements of the city in the future and guide the lines along which it should extend and develop. It is reported that about 45 local planning boards were established in the year. Regarding their work, it is stated that though some remained almost dormant and some met with discouragement from the city officials, the majority did excellent investigation work and discussed a large variety of subjects connected with the planning of towns and that, on the whole, the creation of these boards 'intensified the general interest in civic betterment'.

We are about to get a Town-planning Act for Madras and it may not be uninteresting, therefore, to recapitulate and emphasise a few of the instructive criticisms offered by the Commission on the work of these boards.

In the first place, these boards are instructed to guard against the danger of dwelling too much on present needs and framing short-sighted proposals for relieving them. They are reminded that 'the task of local planning boards is the formation of broad and inclusive plans which will deal in its proper relation with every need of the community'. They should take long views, grasp the needs of the entire city—not merely the present needs or those of the near future—and plan for the natural and orderly growth of the town.

It follows that a detailed and systematic study of existing conditions should be the first task of the planning board—an exhaustive survey of the city—topographical, physical and sociological. We would suggest that the whole town should be studied generally, then sections thereof. All possible questions about the town and the people should be reviewed and the results embodied in succinct reports, illustrated by plans, graphs, etc. The sectional plans and reports should also be duly correlated with those for the whole city. The more intensive this study, the more correctly will the board be able to gauge the lines on which the city should develop.

After such a study, which will be the work of months and even years, comprehensive plans should be prepared for the needs of the classes of the population requiring additional areas on which to settle, the public needs in the way of open spaces, play-grounds, etc., and, generally, regulating the extension of the town. Every individual scheme—be it for opening out a slum or laying out an extension—should conform to and fit in with this large general scheme.

Lastly, we are reminded—we would particularly impress this on our municipal councils—that all this town-planning work will be thrown away unless building regulations are laid down and enforced strictly. Public opinion in our larger towns requires to be educated in this respect.

Many of our municipal councils are formulating and carrying out schemes of town-improvement, and we trust that in working them out they will bear these principles in view. Intensive studies of local conditions, comprehensive general plans, individual schemes so framed as to fit in with the general scheme drawn up for the entire city—to be, in fact, instalments of one preconceived and well-laid out plan—and strict enforcement of building regulations, are imperative if, in attempting to destroy slums, we are not to create worse slums.